

VIDEOTAPE DEPOSITION OF ERIK V. NORDHEIM, Ph.D. 1/26/2012

<p style="text-align: center;">UNITED STATES DISTRICT COURT EASTERN DISTRICT OF WISCONSIN</p> <hr/> <p>ALVIN BALDUS, CINDY BARBERA, CARLENE BECHEN, RONALD BIENDSEIL, RON BOONE, VERA BOONE, ELVIRA BUMPUS, EVANJELINA CLEEREMAN, SHEILA COCHRAN, LESLIE W. DAVIS III, BRETT ECKSTEIN, MAXINE HOUGH, CLARENCE JOHNSON, RICHARD KRESBACH, RICHARD LANGE, GLADYS MANZANET, ROCHELLE MOORE, AMY RISSEUW, JUDY ROBSON, GLORIA ROGERS, JEANNE SANCHEZ-BELL, CECELIA SCHLIEPP, and TRAVIS THYSSEN,</p> <p style="text-align: center;">Plaintiffs,</p> <p>TAMMY BALDWIN, GWENDOLYNNE MOORE, and RONALD KIND,</p> <p style="text-align: center;">Intervenor-Plaintiffs,</p> <p style="text-align: center;">v. File No. 11-CV-562</p> <p>Members of the Wisconsin Government Accountability Board, each only in his official capacity: MICHAEL BRENNAN, DAVID DEININGER, GERALD NICHOL, THOMAS CANE, THOMAS BARLAND, and TIMOTHY VOCKE,</p> <p style="text-align: center;">[Caption Continued]</p> <p style="text-align: center;">VIDEOTAPE DEPOSITION</p> <p style="text-align: center;">ERIK V. NORDHEIM, Ph.D.</p> <p style="text-align: center;">Madison, Wisconsin January 26, 2012</p> <p style="text-align: center;">Peggy S. Christensen, RPR, CRR, CCP Registered Professional Reporter</p>	<p style="text-align: center;"><u>I N D E X</u></p> <p>2 <u>Witness</u> <u>Pages</u></p> <p>3 ERIK V. NORDHEIM, Ph.D.</p> <p>4 Examination by Ms. Lazar 6</p> <p>5 Examination by Mr. Shriner 92</p> <p>6</p> <p>7</p> <p>8 <u>E X H I B I T S</u></p> <p>9 <u>No.</u> <u>Description</u> <u>Identified</u></p> <p>10 1009 Notice of Videotaped Deposition 6/7</p> <p>11 and Subpoena</p> <p>12 1010 CD - Nordheim Production Materials 6/8</p> <p>13 1011 Printout of Exhibit 1010 (CD materials) 6/8</p> <p>14 1012 Report of Erik V. Nordheim 6/15</p> <p>15 1013 Materials from Professor Nordheim's 33</p> <p>16 file - handwritten notes, Compactness 87</p> <p>17 Analysis Reports and Summary Core 87</p> <p>18 Constituency Report</p> <p>19 1014 State of Wisconsin Congressional 87</p> <p>20 Districts map for 2002 redistricting</p> <p>21 1015 State of Wisconsin Act 44 Congressional 87</p> <p>22 Districts map</p> <p>23</p> <p>24 (The original Exhibits 1009-1012 were attached to the 87</p> <p>25 original transcript and copies were provided to 87</p> <p>counsel. The original Exhibits 1013-1015 were 87</p> <p>returned to the witness. Copies were attached to the 87</p> <p>original transcript and were provided to counsel.)</p> <p style="text-align: center;">3</p> <p>26 (The original deposition transcript was filed with 87</p> <p>27 Attorney Maria S. Lazar)</p>
<p>and KEVIN KENNEDY, Director and General Counsel for the Wisconsin Government Accountability Board,</p> <p style="text-align: center;">Defendants,</p> <p>F. JAMES SENSENBRENNER, JR., THOMAS E. PETRI, PAUL D. RYAN, JR., REID J. RIBBLE, and SEAN P. DUFFY,</p> <p style="text-align: center;">Intervenor-Defendants.</p> <p>-----</p> <p>VOCES DE LA FRONTERA, INC., RAMIRO VARA, OLGA VARA, JOSE PEREZ, and ERICA RAMIREZ,</p> <p style="text-align: center;">Plaintiffs,</p> <p style="text-align: center;">v. Case No. 11-CV-1011</p> <p style="text-align: center;">JPS-DPW-RMD</p> <p>Members of the Wisconsin Government Accountability Board, each only in his official capacity: MICHAEL BRENNAN, DAVID DEININGER, GERALD NICHOL, THOMAS CANE, THOMAS BARLAND, and TIMOTHY VOCKE, and KEVIN KENNEDY, Director and General Counsel for the Wisconsin Government Accountability Board,</p> <p style="text-align: center;">Defendants.</p> <p>-----</p>	<p>1 VIDEOTAPE DEPOSITION of ERIK V. NORDHEIM, Ph.D.,</p> <p>2 a witness of lawful age, taken on behalf of the</p> <p>3 Defendants, wherein Alvin Baldus, et al., are</p> <p>4 Plaintiffs, and Members of the Wisconsin Government</p> <p>5 Accountability Board, et al., are Defendants, pending</p> <p>6 in the United States District Court for the</p> <p>7 Eastern District of Wisconsin, pursuant to notice and</p> <p>8 subpoena, before Peggy S. Christensen, a Registered</p> <p>9 Professional Reporter and Notary Public in and for</p> <p>10 the State of Wisconsin, at the offices of Lawton &</p> <p>11 Cates, S.C., Attorneys at Law, Ten East Doty Street,</p> <p>12 in the City of Madison, County of Dane, and State of</p> <p>13 Wisconsin, on the 26th day of January 2012,</p> <p>14 commencing at 1:08 in the afternoon.</p> <p>15</p> <p>16</p> <p>17 <u>A P P E A R A N C E S</u></p> <p>18</p> <p>19 WENDY K. ARENDS, Attorney,</p> <p>20 for GODFREY & KAHN, S.C., Attorneys at Law,</p> <p>21 One East Main Street, Suite 500, Madison,</p> <p>22 Wisconsin 53703, appearing on behalf of</p> <p>23 Plaintiffs Alvin Baldus, et al.</p> <p>24</p> <p>25 P. SCOTT HASSETT and DANIEL S. LENZ, Attorneys,</p> <p>for LAWTON & CATES, S.C., Attorneys at Law,</p> <p>Ten East Doty Street, Suite 400, Madison,</p> <p>Wisconsin 53703, appearing on behalf of the</p> <p>Intervenor-Plaintiffs.</p>

VIDEOTAPE DEPOSITION OF ERIK V. NORDHEIM, Ph.D. 1/26/2012

1 A P P E A R A N C E S (Continued)

2 MARIA S. LAZAR, Assistant Attorney General,

3 for STATE OF WISCONSIN DEPARTMENT OF JUSTICE,

4 17 West Main Street, Madison, Wisconsin 53703,

5 appearing on behalf of the Defendants.

6 THOMAS L. SHRINER, JR., Attorney,

7 for FOLEY & LARDNER, LLP, Attorneys at Law,

8 777 East Wisconsin Avenue, Milwaukee,

9 Wisconsin 53202, appearing on behalf of the

10 Intervenor-Defendants.

11 Also present: Todd S. Campbell, CLVS

12 Campbell Legal Video Company

13 417 Heather Lane, Suite B

14 Fredonia, WI 53021

15 (262) 447-2199

16 Mike Mather and John Pasowicz,

17 Externs, State of Wisconsin

18 Department of Justice

19

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22

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5

1 (Exhibit Nos. 1009-1012 were marked

2 for identification)

3

4 ERIK V. NORDHEIM, Ph.D.,

5 called as a witness, being first duly sworn,

6 testified on oath as follows:

7

8 EXAMINATION

9 By Ms. Lazar:

10 Q Thank you. Good afternoon, Professor Nordheim.

11 A Good afternoon.

12 Q Let's start out with, have you ever given a

13 deposition before?

14 A I have.

15 Q So you know the basic rules?

16 A Yes.

17 Q So we aren't going to talk over each other?

18 A I'll try my best.

19 Q And you'll answer with a yes or a no so the

20 court reporter can take that down?

21 A Yes.

22 Q If you don't understand any of my questions,

23 please ask me to explain them, and I will do so.

24 If you do not do so, I will assume you understood

25 my question.

6

1 A If I give -- If you ask a question and I give a

2 yes or no answer but there is some qualification,

3 can I follow the yes or no with the qualification?

4 Q Absolutely.

5 A Okay.

6 Q And in addition, if at any time you need to take a

7 break, just let us know. All right. We're going

8 to start out, I'm going to show you what's been

9 marked as Exhibit 1009. Have you seen that

10 document before?

11 A Yes, I have.

12 Q And what is that document? Well, actually let me

13 represent that document is the Notice of Videotape

14 Deposition and Subpoena --

15 A Correct.

16 Q -- for today. If you could please turn to page --

17 the last page of that exhibit. On that page there

18 is an Exhibit A. Have you seen that before?

19 A I have.

20 Q And it asks you to produce documents which I'm not

21 going to read to you, but have you produced all

22 documents responsive to that Exhibit A?

23 A Yes.

24 Q And those documents were produced in a CD which

25 has been marked as Exhibit 1010?

7

1 A That CD, does that also include --

2 THE WITNESS: I'll have to ask

3 counsel, does that also include the e-mails

4 or were they provided?

5 MR. HASSETT: E-mails are in there,

6 yes.

7 A Because I know they made a hard copy of the

8 e-mails, and then I also have a stack of papers --

9 Q Okay.

10 A -- some of which are not included on this CD.

11 Q We'll go through that in a moment. What I would

12 like to do now is show you what's been marked as

13 Exhibit 1011, and on the front page I'll represent

14 that that is a screen shot of your CD which shows

15 the files that were included on the CD; is that

16 correct?

17 A Correct.

18 Q So there is basically three folders, one entitled

19 late fall?

20 A Correct.

21 Q One entitled Nordheim inbox out -- e-mails?

22 A Right.

23 Q And outbox e-mails?

24 A Right. And I would like to add that these are on

25 my Gmail account. I did not use my University

8

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1 account. I just did all of this on my Gmail
2 account.
3 Q Okay.
4 A I have no files on my University account relating
5 to this.
6 Q Okay. Let's go through some of the documents that
7 you produced in addition. If you can just explain
8 what they are.
9 A Okay. The first thing I have here are sort of
10 notes, largely scribbles, related to my -- that I
11 produced while I was writing and preparing the
12 report that I wrote having to do with movement of
13 people between districts and compactness. This
14 does include -- I did -- since I do not have
15 electronic versions of it, this does include some
16 of the computer output from -- that I worked on
17 with Mr. Joel Gratz, G-r-a-t-z, to sort of do the
18 computations for number of people moved and
19 compactness.
20 Q And who is Mr. Joel Gratz?
21 A Mr. Joel Gratz is, as far as I understand, sort of
22 an independent individual who provides -- who has
23 software on -- GIS software and census data and
24 the specialized software to determine things like
25 this. It's that I think autoBound program.

9

1 Q And how did you meet Joel Gratz?
2 A His name was given to me by Professor Ken Mayer.
3 Q Okay. We'll go back to that. All right. If you
4 want to just set that aside.
5 A Okay.
6 Q Flip it over so it stays in order.
7 A Okay.
8 Q The next thing is?
9 A The next thing was just -- I mean I tend to be a
10 very curious person and ask for lots of
11 information, so the next thing is just some
12 general information, elective franchise that
13 describes things having to do with the Voting
14 Rights Act and things of that nature, various
15 legal documentation.
16 Q Okay. And next?
17 A I have small copies of the larger maps, both the
18 current and the new proposed congressional
19 districts.
20 Q And for purposes of this deposition, let's just
21 confirm that today we're talking about 2011
22 Wisconsin Act 44 --
23 A Yes.
24 Q -- which is the congressional map?
25 A Correct.

10

1 Q Okay.
2 A I'm only here to talk about the congressional map.
3 Q Perfect.
4 MR. SHRINER: And you refer to that
5 in your report and I assume you will today,
6 because you've just done it, as the proposed
7 map as opposed to the enacted map that's been
8 passed by the Legislature.
9 THE WITNESS: Yes.
10 MR. SHRINER: So when you say
11 proposed, that's what you mean?
12 THE WITNESS: When I say proposed,
13 because I know it's in litigation, I'm
14 referring to that one, the one that has been
15 passed by the Legislature, correct.
16 MS. LAZAR: Correct.
17 MR. SHRINER: And when you're
18 talking current, you're talking about the one
19 that was adopted in 2002?
20 THE WITNESS: Correct.
21 MR. SHRINER: All right.
22 Q (By Ms. Lazar) Then I see you have
23 Professor Gaddie's rebuttal report?
24 A Correct.
25 Q You have --

11

1 A I have my own report.
2 Q Your report, okay.
3 A These are notes prepared by Mr. Gratz when we were
4 double checking some of the output that he came up
5 with from his computer manipulations.
6 Q Okay. If I can just put a Post-It on that one.
7 All right, keep going.
8 A Then these were things that Mr. Hassett gave me.
9 Here is some information that he had available on
10 redistricting and representation. Then I have
11 this document here on federal rules, disclosure of
12 expert testimony.
13 Q And I think you're catching something at the back
14 of that.
15 A Oh. This was -- This should have been with the
16 stuff. This was a list of hours I worked.
17 Q Okay. There is an invoice that probably carries
18 through and does the exact same thing?
19 A Yes.
20 Q All right.
21 A Early on I was interested in knowing -- since I
22 had never participated in a case, you know, a
23 political case like this, I asked for information
24 on, you know, depositions and the reports from
25 previous studies, so I mean this is information

12

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1 from Professor Mayer's report from 2002. So I
2 think this is his report, and I think the
3 deposition is included in here.
4 Q And I note Professor Mayer's deposition was
5 included on the 1010 exhibit.
6 A Yes. Some of these things are doubled here. Some
7 are not.
8 Q Okay.
9 A These are more detailed versions of, we'll call
10 them the old and the new as opposed to the current
11 and the proposed.
12 Q That sounds good.
13 A We'll go with old and new, so these are more
14 detailed maps.
15 Q Okay.
16 A This was an article which I referenced in my
17 report. I think this is viewed as the most
18 authoritative article on compactness by Niemi.
19 Q Okay. That's the one you referenced that is by
20 Niemi and Grofman, "Measuring Compactness and the
21 Role of a Compactness Standard"?
22 A Hang on. No, this one is not. This one is also
23 by Niemi. It's not the same one, I apologize.
24 This one is called Expressive Harm -- This is in
25 the Michigan Law Review, "Expressive Harms,

13

1 'Bizarre Districts,' and Voting Rights." So it's
2 sort of a more detailed -- it's not that article.
3 My apologies. It's a more detailed discussion in
4 a law review of a lot of the issues, but I focused
5 on it to find out what they had to say about
6 compactness.
7 Q Okay. I'm going to put a Post-It on that too, and
8 you can flip it over.
9 A That's fine. And then, just out of curiosity,
10 early on when I was trying to get a sense of what
11 the overall case was about, Mr. Hassett gave me a
12 copy of this. This was an editorial opinion from
13 a newspaper in Portage County.
14 Q Okay. All right. Let's go back a little bit. In
15 your report you have your CV. Is that current and
16 up to date?
17 A Yes.
18 Q So we don't have to go through all of your
19 professional degrees and so forth?
20 A No. That's correct. I think there has been --
21 since that time there may have been a paper or two
22 submitted but not related in any way to politics.
23 Q Okay. And any paper that has been submitted since
24 this CV does not also cover redistricting?
25 A No. Nothing related remotely to this.

14

1 Q All right. As to redistricting, what is your
2 experience in that field?
3 A I have no prior professional experience with
4 redistricting.
5 Q And so I would take it that -- Have you ever
6 testified as an expert regarding redistricting?
7 A No.
8 Q In your expert report, which I took away from you,
9 it's marked 1012, if you want to see that.
10 A Yes.
11 Q In your CV you indicate -- it is on page 11 of
12 your CV, you indicate that you have been an expert
13 witness on two occasions with cases represented by
14 Lawton & Cates. What were those two cases
15 regarding?
16 A Okay. One of them was a case with Tri-State. It
17 had to do with a suit by people who had purchased
18 these prefabricated homes from Tri-State and there
19 was an issue about whether the vapor barrier had
20 been installed properly and there was a class
21 action suit.
22 Q And what did you testify regarding?
23 A Okay. Before I was involved, the judge had
24 suggested that some sample of the 200 and some odd
25 people in the class action suit be taken, and so

15

1 my involvement was to determine whether they were
2 representative. I had data in terms of, you know,
3 health records and so on, and my role there was to
4 determine whether that sample was representative
5 of the population as a whole.
6 Q Okay. And what was the second case?
7 A The second case was one where -- and here I'm a
8 little bit fuzzier on the details. It was one
9 having to do with some dam on the Black River, and
10 I don't even recall if my testimony was on the
11 side of the dam owner or against the dam owner. I
12 again looked at a very limited role there. I was
13 looking at some data on water flow, height of
14 river and things of that nature.
15 Q Okay. And I also note that you were an expert
16 witness for the Wisconsin Department of Justice.
17 A That is correct.
18 Q What did you do for them?
19 A Yes. Okay. Well, that's an interesting case.
20 This had to do with -- This one I remember much
21 better. This one had to do with a complaint filed
22 by a lecturer in a different branch of the
23 University. I'm in the College of Letters and
24 Science. It was a female employee, and she
25 claimed discrimination, wage discrimination and

16

1 other discrimination. I remember your colleague
2 calling me, and I indicated to them I would be
3 happy to look at it but I'm a strong believer in
4 equal pay for equal work and if I didn't think --
5 if I thought the case was appropriate, I would say
6 so. They said fine.
7 So I obviously had no involvement with the
8 parts that dealt with, you know, the he said/she
9 said and sort of the personal discrimination, but
10 I did evaluate information they had available on
11 pay scales and looking at the various status of
12 the people being used in the comparisons and I
13 gave my opinion on that.
14 Q And who did you work with, which Assistant
15 Attorney General?
16 A I can't recall.
17 Q Do you remember what unit they were in? You can
18 say you can't recall if you don't.
19 A I cannot recall that one either.
20 Q Okay. Do you know when that was?
21 A I believe it was 2004.
22 Q Okay.
23 A Plus or minus one year, but I believe it was about
24 2004.
25 Q Okay.

17

1 MR. SHRINER: A statistician would
2 have to have a margin of error.
3 Q Now I also see on the bottom of page 11 that you
4 say you've had no depositions and appearances at
5 trial in the prior four years. Have you had any
6 prior to that?
7 A Well, there was the Department of Justice. I
8 don't think I've had any other depositions. Not
9 that I can recall.
10 There was -- I had actually forgotten about
11 this but Mr. Hassett reminded me, there actually
12 was one additional legal issue that involved
13 Lawton & Cates. This was I believe on the order
14 of 10 or 12 years ago. I was on the University
15 Faculty Rights and Responsibilities Commission and
16 there had been a case where one faculty member had
17 been accused of sabotaging the research of another
18 and the University had -- or administration had
19 dismissed that other individual and that other
20 individual -- the individual who was alleged to
21 have done the sabotaging following his legal right
22 appealed, and the Faculty Rights and
23 Responsibilities Committee was sort of the legal
24 body that represents the faculty to investigate
25 that, and Lawton & Cates was actually representing

18

1 that individual. So I was on this Faculty Rights
2 and Responsibilities Committee that investigated
3 that.
4 Q Okay. You also indicate that you've conducted --
5 you've been involved in numerous consultancies and
6 you list several companies. Were any of them
7 regarding redistricting?
8 A None.
9 Q Okay.
10 A Not even remotely connected.
11 Q How many times have you testified at trial?
12 A I believe twice. In the Tri-State and in the dam
13 case.
14 Q Okay. Have you written any reports or articles on
15 redistricting?
16 A No.
17 Q So nothing that you've written on compactness and
18 minimum population shifts?
19 A No.
20 Q Would it be safe to say in your CV that most of
21 the articles you've written and most of the
22 research you've done would be either in the
23 biological, pathological or physiologically based
24 fields?
25 A I think that's largely fair. I mean I view myself

19

1 as an applied statistician. I have done a wide
2 range of collaborative research with people in
3 many areas. Not everything has shown up in
4 publications.
5 Up until about five or six years ago, I had
6 formal joint connections with the College of
7 Agriculture and Life Sciences. It was only in the
8 last five or six years that I've sort of changed
9 the nature of my appointment. I now have a joint
10 appointment with the Department of Sociology and I
11 have begun a number of projects in the social
12 sciences but none of them have reached the stage
13 of publication.
14 Q Okay.
15 A And I should say that also, this may be relevant
16 somewhat later, but I teach -- I'm the primary
17 instructor or a primary instructor of our
18 department's course on statistical consulting
19 which trains experienced graduate students. I
20 bring a lot of live projects to that, and a fair
21 number of the live projects I've brought to that
22 class are from the social sciences, including the
23 political sciences.
24 Q Okay. Now I want you to look at Exhibit 1011.
25 A Yep.

20

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1 Q Which I will represent are documents I printed off
2 of the CD 1010.
3 A Yes.
4 Q And if you want to start with that.
5 A Okay.
6 Q We're going to go through a few of those. Before
7 we do that, I just have a general question.
8 Exhibit 1012 is your expert report in this case;
9 correct?
10 A That's this?
11 Q Yes.
12 A Yes. That is my expert report.
13 Q Who assisted -- Did anyone assist you in preparing
14 that report?
15 A There was a -- very little. There was a small
16 amount of formatting assistance that I received
17 from Lawton & Cates but nothing on the substance.
18 Q Did anyone help you edit or revise or change that
19 expert report?
20 A I believe I ran a draft by my wife because we
21 often review -- you know, do a little bit of
22 editing of one another, so she made a few very
23 minor editorial changes. No one else.
24 Q Okay. Let's look then at Exhibit 1011. If you
25 could turn to the first page which is marked 2,

21

1 that is an invoice for your time dated
2 December 21, 2011. Do you see that?
3 A Correct.
4 Q In that invoice you have some references to
5 meetings about Joel G. That would be Joel Gratz?
6 A Correct.
7 Q And you have meetings with him on December 7th for
8 two hours. What was that meeting regarding?
9 A Okay. Basically that was the meeting when I first
10 met with him to determine -- okay. I was not
11 familiar with the type of databases that were
12 available and the type of programs that were
13 available to do the computations that I felt were
14 necessary, which was to determine the transference
15 of population from one district to another or with
16 compactness, and so that session was largely
17 devoted to him giving me an understanding of what
18 the software did and then for me to explain to
19 him, as best I could, what I was hoping that we
20 could accomplish together. So that was the main
21 purpose of that meeting, and actually Mr. Hassett
22 was there for a part of that.
23 Q When you say together, though, Mr. Gratz was not
24 helping you draft your report, was he?
25 A He didn't help me draft the report but he -- I

22

1 relied heavily on him for the quantitative output.
2 I do not have access to the software to actually
3 perform the computations.
4 Q Okay. And on December 9, 10 and 11 it shows major
5 analysis, writing and meeting with Joel Gratz for
6 12 hours in those three days.
7 A I would say, of those, meeting with Joel was
8 probably less than two, maybe one.
9 Q And was that also assistance just on --
10 A Yes. It had to do -- In this pile that we turned
11 over, I showed you that there were the output, the
12 computer output from those programs, and it had to
13 do with some final work on those. But he did
14 not -- he did not see the report I think
15 subsequent -- until it had been submitted. Then
16 he -- He had nothing to do with preparing the
17 report.
18 Q Okay. If you could turn to page 3. That page
19 consists of an e-mail stream starting November 30,
20 and it's between you and Ken Mayer.
21 A Correct.
22 Q Who is Ken Mayer?
23 A Ken Mayer is a professor in the Department of
24 Political Science at the University who, to the
25 best of my knowledge, is currently a legal expert

23

1 with Godfrey -- I mean with, yeah, Godfrey & Kahn,
2 and he also participated in the case ten years
3 ago, in the redistricting case ten years ago as an
4 expert witness, and I do know him from the
5 University. We've been on committees together,
6 and he actually was someone who provided the data
7 for one of the political science problems that I
8 brought to my statistical consulting class.
9 Q Okay. On the top e-mail there is a P.S., and it
10 indicates that -- there is a mention that you make
11 to Professor Mayer suggesting that you should
12 collaborate, the two of you. Did you?
13 A We did. I should say the suggestion for
14 collaboration actually came from the lawyers here
15 at Lawton & Cates. The idea was, since I had
16 never participated in anything like this, that
17 Professor Mayer might be in a good position just
18 to give me a brief overview of what the process
19 was and what the issues were, and I did have one
20 brief meeting with him at the beginning.
21 Q And what did you mean when you said you did
22 collaborate with Professor Mayer? What are you --
23 A Okay. I recall that meeting quite well. I
24 indicated -- I asked him in terms -- from his
25 experience with cases of this nature and the legal

24

1 proceedings what are, you know, the salient
2 issues. So he explained to me briefly at that
3 point, you know, the Voting Rights Act, with which
4 I was unfamiliar in detail. He indicated to me,
5 you know, which aspects of that tended to be the
6 ones that achieved most attention in the legal
7 cases.
8 So it was a general discussion of that
9 nature, and then he very briefly described for me
10 the work that he was doing for Godfrey & Kahn, but
11 he was focusing entirely on the legislative
12 districts and he had nothing at all to do with
13 congressional redistricting.
14 Q Did Professor Mayer assist you in drafting your
15 report?
16 A Not at all.
17 Q Did he review your report before it was completed?
18 A No.
19 Q Okay. If you turn to page 4, at the bottom of
20 that e-mail there is an attachment. This is an
21 e-mail from Godfrey -- actually from the attorneys
22 here and it indicates several deposition
23 transcripts.
24 A Correct.
25 Q And I recall seeing that those transcripts are

25

1 included in one of the files on the CD.
2 A Yes.
3 Q Okay. If you turn to the next page, and actually
4 this is going to be the next few pages. It's
5 going to be pages 5 through 9.
6 A Correct.
7 Q There are attachments that are not included on
8 your CD. Do you know why those were not? For
9 example on page 5 there is an affidavit of
10 David Canon and Kenneth Mayer.
11 A I did not download all of them. I looked at a few
12 but I did not download them because I skimmed them
13 and didn't think they were that relevant for
14 future reference. I mean at that point my main
15 goal was to get a sense of what had happened
16 before, and by looking at one or two carefully and
17 skimming others, I felt I had, you know, achieved
18 my goals of getting an understanding of what had
19 happened before.
20 Frankly, there was very little related to
21 compactness in those that I thought was relevant
22 to what I was trying to do.
23 Q Okay. Then if you could turn to page 10. Page 10
24 is an e-mail stream started on December 6, 2011,
25 and it's from Matt Egerer from the Representative

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1 Peter Barca's office. What was your involvement
2 with Peter Barca?
3 A I had no direct involvement. I think this -- I
4 think this was forwarded to me by Mr. Hassett.
5 Q Okay. Did you speak with anyone from the
6 Legislature?
7 A No.
8 Q Any of the Democratic leadership?
9 A No.
10 Q Any of their staff?
11 A No.
12 Q If you could turn to page 12. There is an e-mail
13 stream again, December 7th and December 8th.
14 The top e-mail is from you to your attorney,
15 Scott Hassett; correct?
16 A Yes.
17 Q And it starts with the line, "Joel was unable to
18 finish, but the 'trends' seem to show far more
19 movement of people than the minimum necessary."
20 What was Joel finishing?
21 A It was -- Okay. The first evening I was there
22 after he explained to me what the programs could
23 do, he actually started doing the actual
24 manipulations that were required to produce one of
25 those tables in my report, which was the one

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1 indicating the movement from each congressional
2 district to the other in the redistricting plan.
3 And at the very beginning he thought, oh, I
4 can just do this. You know, if you have two hours
5 or so, I can finish it, and he realized fairly
6 quickly on that he could not do that. So I was
7 referring to that. So that was why he continued
8 to work and I had a subsequent meeting with him.
9 Q So is part of your report then based on the work
10 that Joel Gratz did?
11 A Oh, yes.
12 Q Did he provide any assistance in drafting?
13 A No.
14 Q If you turn to page 16, this is an e-mail dated
15 December 8th from you to your counsel, Scott and
16 Jim; correct?
17 A Correct.
18 Q If you look at the bottom of the e-mail, I guess
19 two -- if you count Thanks, three paragraphs up
20 from your signature line it says, "I might guess
21 that the typical values off the diagonal will be
22 relatively small. If we can contrast the shifting
23 between our Congressional District 3 and 7 (and
24 the reverse) to other data, my guess is that we
25 could show that our case is extreme."

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1 A Yes.
 2 Q Were you -- Let's take two steps back. What were
 3 you asked to do when you were retained?
 4 A Okay. The two primary issues that they asked me
 5 to look at: One, the shifting between
 6 congressional districts as a result of the
 7 redistricting plan, and the second one was an
 8 assessment of compactness. So what I was
 9 referring to here -- May I refer to my report?
 10 Q Absolutely.
 11 A Okay. What I was -- At that point I was thinking
 12 primarily in terms of Table 2 on page 4 of my
 13 report. These were -- We had some preliminary
 14 data relating to this table.
 15 Q Okay.
 16 A And I'm sure we'll get back to this later, but as
 17 you can see, the two -- the diagonal terms refer
 18 to sort of maintaining the core constituency, and
 19 the terms off the diagonals refer to transference
 20 from one district to another. And at that point
 21 in time I had ascertained that it was very likely
 22 that the largest entries off the diagonal would
 23 relate to Congressional Districts 3 and 7.
 24 Q Okay.
 25 A So that's what I was referring to.

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1 Q Assuming I know nothing about statistics or
 2 anything such as that, what do you mean by off of
 3 the diagonal?
 4 A Okay. In this table --
 5 Q Yes, I see the table.
 6 A -- this is the diagonal.
 7 Q Okay. You're just going a diagonal line in the
 8 table?
 9 A Yes.
 10 Q Okay. And why are you doing that?
 11 A Because -- Okay. So basically the way this table
 12 was set up is that the individual rows represent
 13 the current districts and the columns represent, I
 14 use the terminology proposed, but to use more
 15 appropriate terminology, the ones that were passed
 16 in the bill.
 17 So what this indicates, that of those
 18 individuals that were, say, in Congressional
 19 District 1, this is -- this was what happened to
 20 them or will happen to them according to this
 21 plan. 686,000 will stay in District 1. 3,764
 22 will move from District 1 -- or be required to
 23 move from District 1 to District 2. District 1
 24 and District 3 are not adjacent.
 25 Q Okay.

30

1 A And so there would -- so there would be no
 2 movement.
 3 Q No bouncing people on the dots?
 4 A Correct, and so on. So the diagonal would
 5 represent the maintenance of the core, people who
 6 in the old districts were in that congressional
 7 district who in the new districts would remain.
 8 That's the diagonal.
 9 It's -- The elements off the diagonal
 10 represent movement, the people being asked to
 11 shift from one congressional district to another.
 12 Q In your e-mail here, though, you're talking about
 13 the typical values off the diagonal will be
 14 relatively small.
 15 A Correct.
 16 Q And you're commenting on maybe contrasting
 17 something else. Were you trying to reach a
 18 certain outcome in your report or were you asked
 19 to come to a conclusion without having a specific
 20 outcome in mind?
 21 A Well, I had -- when I began this, I had no
 22 specific outcome in mind. I mean I'm solely
 23 dedicated to finding what -- you know, what the
 24 truth of the matter was. But by this time it
 25 already had become clear to me that the biggest

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1 issue in terms of movement and change in shape and
 2 so on, as one can see from the maps, had been
 3 District 3 and District 7, and I was sort of
 4 validating -- so this was halfway through my
 5 analysis and I was validating what my sort of
 6 preliminary thoughts had been from my earlier
 7 analysis.
 8 Q Okay. If you can turn to page 17. This is an
 9 e-mail December 8 from you to your counsel, and
 10 again you're mentioning Joel Gratz and you're
 11 asking him to -- you're asking that your report --
 12 well, actually it says there is some initial
 13 findings. You're asking that they be shared with
 14 Joel for any comments he might have and to look at
 15 a minor error in the report. Again I'm going to
 16 ask you, is Joel helping you do your report here?
 17 A No. My main concern at this point in time -- I
 18 mean, I'm a stickler for accuracy, and his numbers
 19 differed by two from what they should have been,
 20 and I was concerned about that.
 21 Q Okay.
 22 A The Summary Core Constituency Report -- May I turn
 23 this over?
 24 Q Sure.
 25 A I mean that basically -- those are the Summary

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1 Core Constituency Reports. So when I referred to
2 report, this is the report he made. It's sort of
3 the standard output from his autoBound program.
4 So I was referring to that.
5 Q And now that report is not on this disk.
6 A No. I never got an electronic version. I only
7 have the hard copy of this.
8 Q Then why don't we mark that whole set.
9 A That would be fine. Let me pull that out here.
10 Q We will mark it as 1013. If you could hand that
11 to the court reporter.
12 A Sure. I would be happy to. Let me make sure that
13 this is everything I have. Yes.
14 Q And what are those other notes in front of that?
15 Do those belong with it?
16 A These are scribbles that in part are related to
17 it. In part they were related to -- I mean right
18 here I was spending some time understanding how
19 the different measures of compactness worked, so
20 these were just my scribbles related to that.
21 Q Since that whole set was clipped together, why
22 don't we clip it all together as one and then stop
23 for a moment and have the court reporter mark the
24 entire packet as 1013.
25 A That's fine. All right. That would be fine. If

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1 I may add a comment?
2 Q You can't. You have to let the court reporter
3 type.
4 A I'm sorry.
5 MR. SHRINER: Her hands are busy.
6 (Exhibit No. 1013 marked for
7 identification)
8 Q Go ahead.
9 A Okay. I think at the time I wrote this when I
10 said please -- okay, these initial findings,
11 please share these with Joel, I think at that
12 point in time I was -- you know, not having been
13 involved with this process before, I was not as
14 familiar as I am now with the idea that all of
15 these things should be done, you know,
16 independently, and so I think -- I now realize it
17 was inappropriate to share anything with Joel
18 except my concern for checking on the numbers, and
19 I think that's what happened.
20 Q Okay. If you want to turn to page 18. The third
21 paragraph, this is an e-mail from you to your
22 counsel dated December 11, 2011, and the third
23 indented paragraph says, "The most difficult
24 section to write was the one relating to
25 compactness."

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1 A Yes.
2 Q "This is a highly contentious area and I am sure
3 the other side will provide their expert to try to
4 rebut my views."
5 A Yep.
6 Q What do you mean by "this is a highly contentious
7 area"?
8 A All right. I had spent some time reviewing some
9 of the literature in this area. In particular,
10 those two articles that I cited in my report dealt
11 with compactness. I had looked at, you know,
12 scanned or skimmed some of the reports from the
13 2002 trial that dealt with compactness and
14 realized that there were, you know, lots of
15 arguments on this. It's because there is no
16 single measure of compactness that properly
17 captures all of the issues.
18 At this point in time I was just beginning my
19 study of it, and you will probably notice that in
20 my report I put a good deal of time and emphasis
21 into explaining the various issues, indicating why
22 some measures are relatively more useful, in some
23 areas why cautionary comments need to be provided,
24 why one cannot trust any of these excessively.
25 But at the end when I put my final report

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1 together, I felt much more comfortable with my
2 knowledge and understanding of compactness and,
3 you know, feel very strongly in support of the
4 comments that I made in the report.
5 Q And then at the end of that, the last two
6 sentences, or the second-to-the-last sentence
7 says, "Any attempt to rebut will just focus the
8 judge's attention on the population shifts between
9 Districts 3 and 7, which is a good thing." So was
10 your report, in essence, a way to, let's say,
11 throw spaghetti on the wall and see if anything
12 stuck, to see if the Court was going to disregard
13 the facts?
14 A No. My -- It was clear at this point in time that
15 certainly the primary issue in the redistricting
16 had to do with the shifts between 3 and 7. That
17 was pretty clear to me at that point in time. And
18 I had a sense that, in terms of, you know, the
19 legal case that was pending, that that was going
20 to be the part that received the most attention.
21 Q So you would say, though, in your report then,
22 since you have two goals and two parts, the
23 population shifts and compactness, that you have
24 more -- you're putting more weight on the minimum
25 population shifts than the compactness side?

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1 A They go together. I mean I think that I'm
2 indicating that the compactness is going to be
3 somewhat more qualitative than -- just because the
4 measures of compactness are subject to these kinds
5 of concerns. But I do think they go together and
6 buttress the claim that there are legitimate
7 questions that can be raised about the drawing of
8 the lines between Districts 3 and 7.
9 Q Okay. If you turn to page 19 --
10 A But I should say that when I began all of this,
11 you know, I had -- you know when I first met with
12 them, I had no idea that this was going to be the
13 issue. I mean these were conclusions that I came
14 to as I started looking at the data.
15 And if I may, if I may pull out the maps, I
16 mean just a visual description of the maps, one
17 can see, you know, that here most of the --
18 you know, clearly it's an unusual state. I mean,
19 you can imagine if we have a Mississippi River
20 district, it's going to be long along the
21 Mississippi, but in general there are no really
22 weird shapes.
23 Q And when you're saying "here," for the record,
24 you're referring to the map that was drafted by
25 the Court in 2002?

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1 A Right. But if I look at the map that's drawn --
2 MR. SHRINER: No, it was passed by
3 the Legislature.
4 MS. LAZAR: No, this one here is
5 the 2002.
6 THE WITNESS: This one is 2002.
7 MR. SHRINER: Drawn by the
8 Legislature.
9 MS. LAZAR: Oh, this was drawn by
10 the Legislature?
11 MR. SHRINER: Yes.
12 MS. LAZAR: Okay. This is not the
13 Court-drawn map?
14 MR. SHRINER: There was none.
15 Q This is the Legislature map. The other map you
16 have is Act 44 from 2011?
17 A Yes.
18 Q Okay.
19 A And just looking at this, one can see that
20 District 3 now has this rather unusual shape. So
21 it is clearly, in terms of shape, just visually,
22 you know this is something I saw the very first
23 day when I was appraised of the issues involved,
24 so, I mean, it was fairly -- so immediately one's
25 eyes are drawn to these two districts as the ones

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1 of concern in terms of unusual changes. So I
2 would say that's my argument there.
3 Q All right. If you can turn to page 19. It's an
4 e-mail dated December 11, 2011. You're sending a
5 draft of your report to your counsel asking if
6 they have any comments. Did they have any
7 comments or changes?
8 A No. I mean they -- okay. Yes, they did have one.
9 I think they were very careful not to say much.
10 They did -- Let's see. If I may look at my
11 report.
12 In my original report I did not have either
13 of the two figures, and I think the suggestion
14 came from Mr. Olson that I take the information
15 provided in Table 3 and, if I could, make a figure
16 that would illustrate Table 3, and similarly with
17 Figure 2 which essentially comes from the
18 information in Table 5. Other than that, they had
19 no other comments. So I did those.
20 Q And what you're talking about is the figures, the
21 graphical figures, not numbers in your report?
22 A Correct.
23 Q Okay.
24 A Taking the same information from the tables and
25 making figures out of them. That was the

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1 suggestion of Mr. Olson, and I thought it was a
2 good one and I followed it.
3 Q If you turn to the next page, it's page 20. It's
4 an e-mail, and the sum and substance of the e-mail
5 is a decision from the District Court in Illinois,
6 *Radogno*, R-a-d-o-g-n-o. Did you get a copy of
7 that decision?
8 A I cannot recall if I received a copy. I do not
9 recall looking at it.
10 Q Okay. If you can turn to page 22, there is an
11 e-mail stream that starts -- a thread that starts
12 on December 12th. It has to do with a contact at
13 the DNC. Did you contact anyone at the DNC?
14 A I did. Okay. So at this point in time my concern
15 was the shifts in population between congressional
16 districts. I had no idea if -- relative to
17 other -- you know, in other states, in previous
18 redistricting efforts, particularly in state -- I
19 was thinking particularly in states where the
20 total number of congressional districts did not
21 change, I was interested if there might be a
22 database that would give me an indication of,
23 you know, how many people were shifted from one
24 district to another, and Mr. Hassett had I think
25 found the name of this person. I called him. He

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1 indicated that there might be something. I told
 2 him that I would get back to him if we wanted to
 3 pursue it, and we did not pursue it.
 4 Q And the person that you're referencing is a
 5 John Ray?
 6 A Yes.
 7 Q Okay.
 8 A He seemed to imply that they had some of this
 9 information but not very much.
 10 Q If you can turn to page 25. It's an e-mail dated
 11 January 3, 2012 from you to Ken Mayer. Do you see
 12 that?
 13 A Yes.
 14 Q In your e-mail -- and we're not going to read it
 15 all -- you're talking about an idea you have for a
 16 possible joint research topic. Is that regarding
 17 this case?
 18 A Not directly, but actually it was -- your -- if I
 19 may, your segue between the previous message and
 20 this one is wonderful. I was thinking --
 21 Q Thank you. I'll take credit for that.
 22 A Yes. I was thinking that, you know, hey, just
 23 from a scientific point of view, apart from this
 24 case, if there were such a database that indicated
 25 in all states when there was redistricting, where

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1 the number of districts did not change, what were,
 2 you know, the results in terms of typical numbers
 3 shifted from district to district and how might
 4 that change according to whether or not one
 5 political party controlled all the government,
 6 whether it was split, whether there was a
 7 commission, and then maybe to do an evaluation of
 8 that. I thought this would be an interesting
 9 project, and Ken and some of his colleagues,
 10 you know, just informally in the past, *Boy, it*
 11 *would be fun to do some collaborative research*
 12 *project.*
 13 So this was actually suggested by this, but I
 14 anticipated the results here would have no bearing
 15 at all on this case, and these are perfectly --
 16 these are totally nonpolitical. I mean this is
 17 just -- well, I won't say nonpolitical, but
 18 nonpartisan. This is just sort of a developing
 19 science and sounded like a fun project.
 20 Q Did you ever do this project?
 21 A Ken has expressed interest but he indicates that
 22 there are a number of colleagues that he has that
 23 he tends to work on these issues with. He has
 24 not -- he had not had a chance to discuss them and
 25 I guess because he's been busy he has not had time

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1 to pursue it, but I think the plan is that we want
 2 to do it. I think we probably will wait until all
 3 of the redistricting this year has been completed.
 4 Q Good idea.
 5 A So that we will have an up-to-date database. So I
 6 think the hope is we'll do it but we have not
 7 started in any way.
 8 Q Okay. If you could turn to page 26. This is an
 9 e-mail with the heading line on top. It's dated
 10 January 4, 2012. It's a Reference Manual on
 11 Scientific Evidence on *Daubert*. Did you get this
 12 e-mail -- Did you get the information in this
 13 e-mail?
 14 A I did.
 15 Q Did you look up anything about *Daubert* standards?
 16 A I just skimmed it. I realized fairly early on
 17 that probably in terms of what I was asked to do
 18 it wasn't terribly relevant, but I did skim it.
 19 Q Did it have any impact in your report?
 20 A Not at all. And this was actually after I had
 21 submitted my report.
 22 Q I did see that. Did it change anything in your
 23 report?
 24 A No.
 25 Q The next page is page 27. There is an e-mail

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1 January 12, 2012. The heading line is that
 2 redistricting summary from Legislature. It's an
 3 e-mail from Joel Gratz, I'm assuming, to you?
 4 A Yes.
 5 Q And what is that?
 6 A I don't recall. I looked at it briefly, realized
 7 it was not relevant to anything that I was doing.
 8 So I honestly do not recall.
 9 Q Okay. If you can now take a look at Exhibit 1012
 10 which is your expert report.
 11 A Got it. Thank you.
 12 Q Okay. In the beginning you state, in your
 13 affidavit, that all of your expressed opinions are
 14 grounded on sound statistical practice. What do
 15 you mean by that?
 16 A I have, you know, personally I think a very strong
 17 feeling of ethics about my discipline and I'm very
 18 careful at evaluating and checking my work using,
 19 you know, the most up-to-date statistical
 20 methodology available and I just wanted to
 21 reassert that I was very conscious of that and was
 22 trying my best to uphold that.
 23 Q Now your actual report is attached as Exhibit B --
 24 A Correct.
 25 Q -- to this report; correct?

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1 A Correct.
 2 Q Are all of the opinions you are going to be giving
 3 at trial contained in this report?
 4 A Yes, although it's possible that if I were asked I
 5 might make some comments on Professor Gaddie's
 6 response to my report.
 7 Q We'll get into that.
 8 A But, I mean, that's something that's beyond this.
 9 But other than that I do not anticipate making
 10 comments on anything else.
 11 Q So your opinion is going to be limited to the
 12 minimum population shifts and compactness of
 13 Congressional District 3?
 14 A Correct. Well, the report is on all of them. My
 15 comments are that the most unusual of the
 16 districts is District 3. But, I mean, obviously I
 17 evaluated all of them.
 18 Q Okay. Aside from possibly responding to
 19 Professor Gaddie's rebuttal report, are there any
 20 other opinions that you will be giving at trial?
 21 A No.
 22 Q Do you have an opinion as to the constitutionality
 23 of Wisconsin Act 44?
 24 A That's outside of my field of expertise. I'm a
 25 statistician, not a legal scholar.

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1 Q Okay. Let's go a little bit to redistricting
 2 principles. Do you know what some of the
 3 traditional factors are for redistricting?
 4 A Yes. I did look at the -- I have looked at that.
 5 I did look at the Voting Rights Act and things of
 6 that nature, so yes.
 7 Q So what are some of the factors?
 8 A Well, clearly one has to maintain population,
 9 population equality. That's one of the main
 10 issues. Clearly the Voting Rights Act's opinions
 11 on sort of fair opportunity for various minorities
 12 to elect a representative is a big part of it, and
 13 I gather from what I've read one of the main
 14 sources of litigation, but there are also issues
 15 relating to compactness, communities of interest
 16 and things of that nature.
 17 Q Which factor of those that you've listed would be
 18 considered the most important?
 19 A I'm not sure I'm in a position to say. I think
 20 that's a legal issue. My understanding is
 21 certainly the -- from what I've seen, racial
 22 issues seem to have the most cache, but other than
 23 that which should be, I'm not in the position to
 24 say. That's outside of my field of expertise.
 25 Q Where would you believe that compactness would

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1 fall in that ranking?
 2 A I would think that it's -- you know, it would be
 3 part of an overall pattern of whether or not there
 4 were changes in shifts that appeared excessive. I
 5 think it would be part of a larger picture. I
 6 don't think it should be viewed in isolation.
 7 Q Okay. Your report, half of it deals with
 8 compactness; is that correct?
 9 A Correct.
 10 Q Would you agree that absolute compactness is an
 11 impossibility?
 12 A Okay. As I indicated -- okay. Each of these -- I
 13 mean I actually did some research on this, and as
 14 I indicated in there, I mean this idea of
 15 compactness is not restricted to politics and
 16 districts. I mean ecologists deal with these
 17 issues; city planners deal with these issues. I
 18 mean this is largely a geometrical issue.
 19 Basically there are so many aspects of areas
 20 that are in my view very difficult to accurately
 21 describe with a single number. We have a
 22 tendency -- in our society scientists have a
 23 tendency to want to describe things with a single
 24 number, and I think that can be very misleading.
 25 However, just because it's difficult doesn't mean

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1 one should avoid trying some quantification.
 2 It is clear that of the measures of
 3 compactness, different ones refer to different
 4 aspects of shape. I believe by looking at a
 5 number of these measures, looking at them
 6 carefully and interpreting them cautiously, one
 7 can gain some real understanding about what's
 8 going on.
 9 Q What -- You mentioned measures. What is your
 10 definition of compactness?
 11 A Okay. Compactness essentially is a notion of how
 12 sort of clustered, close together a geographical
 13 region is. A circle, for instance, would be the
 14 most compact because you have the most area with
 15 the smallest perimeter. You have the shortest
 16 distance between any two points, so a circle would
 17 be viewed as the most compact area that one could
 18 come up with. Obviously no state can be composed
 19 of a bunch of circles because that leaves some big
 20 holes, even if we, you know, don't even think
 21 about the unusual borders.
 22 Q Right. But are there other measures of
 23 compactness?
 24 A Well, as I indicated, if you were to look at that
 25 article by Niemi, et. al., which I gather is one

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1 of the most widely cited in the area, they
 2 identify at least 20 measures and indicate that
 3 there are others.
 4 The autoBound program gives results for five
 5 particular measures which cover a range of the
 6 procedures, and so those -- since I could get
 7 quantification on those, those are the ones on
 8 which I focused.
 9 Q Okay. And now the two articles you're referring
 10 to are an October 2006 Azevea White Paper?
 11 A Correct.
 12 Q And that would be what I have here. We're not
 13 going to mark it.
 14 A Correct, correct.
 15 Q And it is also a Journal of Politics article 1990
 16 by Richard Niemi and Bernard Grofman?
 17 A Correct, who is, if I recall, one of the expert
 18 witnesses in this case.
 19 Q I seem to recall that name as well. Would you
 20 consider these two reports to be authoritative and
 21 well-respected in the community?
 22 A The -- Certainly the Niemi and Grofman one is
 23 highly cited, and I believe even Ken Mayer cited
 24 it in one of his reports. The other one I had not
 25 seen before. It made sense to me. I can't speak

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1 to how the community views it.
 2 Q Okay. In doing some research myself on different
 3 types of compactness, I came up at least three
 4 versions -- or measures: Dispersion, perimeter,
 5 and population measures.
 6 A Correct.
 7 Q Did you use any of those?
 8 A I used two of those. I used the ones that were
 9 related to dispersion. And what was the
 10 terminology you used for the first?
 11 Q I said dispersion, perimeter or population.
 12 A Okay. I used the word indentation for perimeter.
 13 Q Okay. So the two measures, you did five tests?
 14 A I did five tests. Basically the software is not
 15 available to do the population-based ones because
 16 the population-based ones essentially take into
 17 account -- okay. The others just look at
 18 perimeter and area and they don't pay any
 19 attention to population density within any of
 20 these regions. You know, the fact, clearly if we
 21 take a look at District 2, the population is going
 22 to be much denser around Madison and Dane County
 23 than anywhere else. These population-based
 24 measures will take that into account. They are
 25 much rarer. There is not much software available

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1 for them. So I did not use any of those because
 2 those were not available to me, but I did use, for
 3 instance the article, this one, Azevea article, it
 4 only referred to the perimeter and the dispersion
 5 ones.
 6 The dispersion measures basically refer to --
 7 sort of are very sensitive to maximum distances.
 8 If I have, say, a long, thin rectangle, there you
 9 will have a large distance between the most
 10 extreme points, and the dispersion measures will
 11 be very susceptible to that.
 12 Q And how would that rank compact-wise? It would
 13 not be very compact?
 14 A That is not compact compared to a circle or a
 15 square.
 16 Q Okay.
 17 A The perimeter measures tend to look somewhat
 18 more -- are more focused on the shape of the
 19 region. Sort of unusual, you know, twists and
 20 turns. They're much more sensitive to that.
 21 But I did use two of those three, the
 22 perimeter -- what you called the perimeter ones
 23 and the dispersion ones. Of those five methods I
 24 reported on, these were the five, the five methods
 25 on which this autoBound software provides

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1 computations. Three of those are based on the
 2 perimeter methods, primarily -- would be viewed
 3 primarily as perimeter methods, and two of them
 4 would be viewed as primarily dispersion methods.
 5 Q It's not the other way around? I thought the
 6 first three were dispersion methods.
 7 A No. The first three are indentation methods.
 8 Q Okay. So I have that reversed. So the first
 9 three of your five tests are indentation?
 10 A Right.
 11 Q Then four and five are dispersion?
 12 A Correct.
 13 Q Okay. We will get to that in a moment, but I want
 14 to do a few more follow-up. So you used the five
 15 default measure tests that were in the autoBound
 16 software?
 17 A Correct.
 18 Q Do you know if there is an ideal standard or
 19 preferred method to use for compactness?
 20 A I believe there is not. I believe it is quite
 21 subjective. But, again, I'm not an expert on the
 22 legal literature here, but it's my understanding
 23 that there is no single one, and I don't think
 24 there should be a single one.
 25 Q Did you do an overall compactness score for all of

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1 the districts?
2 A I don't believe that would make any sense.
3 Q Okay. Do you know how that -- Where did you get
4 the data that you used to do your tests?
5 A Okay. The data -- okay. The data I understand it
6 were the census data that was used by the
7 Legislature. I think Mr. Gratz received that from
8 the legislative redistricting office or the data
9 office that supports that, but they are -- it was
10 my understanding those are exactly the same data
11 that the Legislature used, and then he had the GIS
12 software and this autoBound software to do the
13 computations. And I actually asked Mr. Gratz to
14 walk me through details of the computations so I
15 felt comfortable with them.
16 Q Okay. Do you know what a differential means test
17 is?
18 A Not by that terminology.
19 Q Okay. Correct me. What terminology would you
20 know it by?
21 A I'm not sure what you're referring to.
22 Q Okay. Are you aware if there is a federal
23 constitutional requirement as to the standard of
24 compactness which has to be achieved in
25 redistricting?

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1 A I don't think there -- I don't know of any.
2 Q Would you know if there would be any Wisconsin
3 constitutional or statutory requirement?
4 A I don't know of any.
5 Q And you mentioned before that you didn't know if
6 there was a preferred standard. Is there an
7 acceptable legal range for compactness?
8 A Not that I'm aware of.
9 Q Would you think that there is a level where -- of
10 compactness or noncompactness which would be,
11 per se, unconstitutional?
12 A I would not think so, but, as I indicated, I think
13 it would not be a good idea to look at compactness
14 in an isolated fashion. I think it needs to be
15 looked at in conjunction with other factors.
16 I looked at two of the factors that could be
17 considered, and those are movement and
18 compactness, but there are other issues having to
19 do with community of interest and I really think
20 they need to be looked at jointly.
21 Q And how would you rank compactness with those
22 other two?
23 A I don't think I can.
24 Q Okay. So you would agree that there is sort of a
25 complex interplay that a Legislature has to look

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1 at when they're trying to do redistricting?
2 A Correct.
3 Q And one of those subjects or areas is compactness;
4 correct?
5 A Correct.
6 Q Would you also agree that if a Legislature or
7 Court -- strike that. Would you agree that a
8 Legislature or Court should give consideration to
9 compactness but it would only be one factor in
10 redistricting?
11 A Yes.
12 MR. SHRINER: Excuse me.
13 Q Do you know if a -- Would you say if a Legislature
14 or a Court makes a good faith effort to keep a
15 district compact, would that be sufficient to find
16 a map constitutional?
17 MR. HASSETT: I'll object as to
18 foundation. He's already stated that he's
19 not a legal expert. He's been hired to
20 provide statistical analysis, and you're
21 asking him a series of questions that call
22 for legal conclusions.
23 Q If you can, you can answer that.
24 A I would say I don't feel I have the expertise to
25 do that.

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1 Q Okay. We mentioned before, and I'm going to
2 show you what was in your set of documents,
3 Professor Gaddie's rebuttal report.
4 A Yes.
5 Q It has previously been marked in these series of
6 depositions as Exhibit 58. And, by the way, we
7 are really not at 1012. We started at 1001 on our
8 side. So here is the Professor Gaddie rebuttal
9 report.
10 A Yeah. It would be too boring just to start at 1
11 all the time, so maybe next time you could start
12 with 503 or something.
13 Q The Court might frown on that, but this was
14 Exhibit 58. And I was going to ask you if you've
15 seen it, but since you produced a copy you have
16 seen the report?
17 A I have seen it.
18 Q And you would probably also be aware that when you
19 look at this report -- well, unfortunately there
20 are no page numbers. So if you look at the second
21 page in on the report, paragraph 3, it talks about
22 compactness in Act 44. Do you see that?
23 A Yes.
24 Q And it talks about your report?
25 A Yes.

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1 Q And would you agree with this rebuttal report?
 2 A I have concerns with it.
 3 Q And what are those concerns?
 4 A Do you want me to start just with section 3 or
 5 both of them together?
 6 Q Both of which?
 7 A Okay. Both item 2 and item 3 refer to my report.
 8 The rest of his comments refer to I think what
 9 Professor Mayer did. But both his items 2 and
 10 item 3 refer to my report.
 11 Q You can start --
 12 A And I do have concerns with both of his points.
 13 Q Okay. You can start with item 2.
 14 A All right.
 15 Q That's on the first page.
 16 A Right. This one has to do with movement of
 17 district lines.
 18 Q Correct.
 19 A So he makes the point that sometimes there are
 20 reasons why large movements of individuals -- I
 21 never brought in the word gerrymandering but he
 22 did. He said there could be large movements of
 23 individuals without there being gerrymandering,
 24 and he particularly identified the state of Iowa.
 25 Iowa has a commission that does these things, and

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1 he presented in an appendix here some maps and
 2 shows that the numbers moved in Iowa are
 3 substantially greater than the ones here.
 4 However, I think his comments are incomplete
 5 and potentially misleading. First of all, I
 6 actually went and I looked at the Iowa statute.
 7 The Iowa statute does have -- does direct a
 8 nonpartisan group to do these things. There is a
 9 computer program that does it. But they have
 10 rather strict criteria. The first criterion is
 11 equal population. The second criterion is keeping
 12 counties together. And then below it lists
 13 compactness but it says compactness is much less
 14 important than keeping counties together.
 15 So if you want to equalize population and
 16 keep counties together, I mean that sort of
 17 becomes a computing burden to do that. So that's
 18 why they have large amounts of movement.
 19 We in Wisconsin do not have such, to the best
 20 of my understanding do not have any requirements
 21 for keeping counties together, so that argument to
 22 support why there might be large movements doesn't
 23 hold here.
 24 Moreover, I actually -- as a result of this,
 25 I actually did some further investigation. And if

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1 you look at the lines between Congressional
 2 Districts 3 and 7, the old map --
 3 MR. HASSETT: In Wisconsin, to
 4 clarify?
 5 THE WITNESS: In Wisconsin.
 6 Q Okay. Not in Iowa?
 7 A No, in Wisconsin. The old map has one county
 8 that's split between the two districts. The new
 9 map has five. So not only did they move a lot of
 10 people, they split more counties.
 11 Q And that's the -- that's what you dispute in
 12 paragraph 2 of -- or section 2 of
 13 Professor Gaddie's --
 14 A As I say, it's not incorrect on the face of it but
 15 it's incomplete and potentially misleading. I'm
 16 not disputing his statement that one can move
 17 large amounts of people without there being
 18 gerrymandering, but I don't think that's relevant
 19 for Wisconsin because we do not have a statute
 20 that requires keeping counties together. And
 21 moreover, even if that were an issue, more
 22 counties were split.
 23 Q And then paragraph 3 deals with compactness in
 24 Act 44?
 25 A Yes. Okay. So I guess I have two concerns with

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1 this. I have a minor technical concern and I
 2 think a more important substantive concern in
 3 terms of what he addressed.
 4 The minor technical concern is one where he
 5 actually performs or has performed some formal
 6 statistical significance. He has indicated that
 7 he looked for a correlation between compactness
 8 both before and after and found that they are
 9 significant, and then he also claims that he did a
 10 paired t-test on the changes in compactness
 11 measures and found they were not significant.
 12 Okay, first of all, every statistical
 13 technique that one uses has underlying
 14 assumptions. The key assumption that underlies
 15 both this test for correlation and the t-test is
 16 that the individual entities, in this case the
 17 compactness for each district, that they are
 18 statistically independent, which means that
 19 information about one does not give direct
 20 information about the other. These are clearly
 21 not independent because changing the compactness
 22 for one district is going to affect the
 23 compactness for the adjacent district. So to
 24 claim that these statistical tests are appropriate
 25 for data of this nature is not correct because

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1 he -- because the individual observations that go
2 into this are not independent.
3 I have not had enough time -- Now every
4 statistical technique, one worries about the
5 question of robustness, how well will the
6 procedure work even if the assumptions are not
7 met. I have not had a chance to think in great
8 detail about this, and it's possible that maybe
9 the results wouldn't be changed that much. But
10 it's possible that they would be.
11 But in point of fact, the assumptions that
12 underlie the technique that he used here are not
13 met, so I think it is inappropriate to do this
14 kind of inference and report on this kind of
15 inference without substantially more evaluation of
16 those assumptions. That's the minor point.
17 The major points are I think he -- he changes
18 the focus of what I viewed as my main argument.
19 First of all he talks about high positive
20 correlation between compactness before and after.
21 I mean that, if I may be allowed to say so, is a
22 little bit of a red herring. If I have
23 congressional districts, say like District 8 which
24 has the Door County peninsula, which has --
25 you know, provides some, you know, unusual

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1 features which will cause it to have relatively
2 low compactness scores, well, as long as
3 Door County peninsula remains in District 8, the
4 compactness scores are going to be low before and
5 low after, and those may be like Congressional
6 District 2 which are more square like, I mean
7 they're going to be relatively higher. So that
8 the fact that the correlation -- that there is a
9 positive correlation is a red herring.
10 Then he talks -- Then in the second paragraph
11 he refers to sort of overall statements about the
12 entire state indicating that -- you know, okay,
13 that the compactness scores now aren't that
14 different from before and that the correlation,
15 you know, is significant. I have not -- you know
16 in my -- if you read carefully my report, I did
17 not make claims that in general the compactness
18 scores were -- in all districts were wildly
19 changed. As a matter of fact, I indicated that
20 for most of the districts the compactness scores
21 changed relatively little. My main point was that
22 the one district that was most subject to change
23 of compactness scores was District 3. So I made
24 no -- So again he's raising an issue which I don't
25 think -- which is a different issue which has to

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1 do with the overall averages for the state, and I
2 was not making claims about that. My claim, and
3 if you read my report, I'm focusing on the fact
4 that from a point of view of compactness the one
5 district which was changed far more than any other
6 was District 3.
7 Q And point of fact, if you look at page 10 of your
8 report, it would be the last page of the document,
9 your second conclusion states that "The proposed
10 plan for CD3," Congressional District 3, "results
11 in a considerable decrease in compactness (as
12 measured by indentation-based measures). The
13 proposed plan will have relatively smaller effects
14 on the other districts."
15 A Correct.
16 Q So you're saying that the change in compactness in
17 Congressional District 3 is the one that is of
18 concern to you?
19 A Yes. And I think his comments took away --
20 you know, didn't address my concerns with
21 District 3 and tried to change the argument to
22 look at overall, and I specifically stated I did
23 not think the overall case was one of relevance.
24 Q Did you have any other disputes or concerns about
25 Professor Gaddie's rebuttal report?

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1 A No, I did not. Again, the rest of his report
2 referred pretty much to the legislative districts,
3 and I have not been involved with those.
4 Q Okay. Let's focus now a little bit on your
5 report.
6 A Fair enough.
7 Q Exhibit 1012.
8 A So that's going to be the magic number for me,
9 1012?
10 Q Yes.
11 A All right.
12 MR. SHRINER: You never know until
13 she leaves.
14 A I'll remember that. I'll maybe get a big number
15 1012 and post it on -- frame it and post it on my
16 wall.
17 Q You start out in your report indicating that you
18 have two goals, and if I can sort of paraphrase,
19 the goals are to tabulate minimum population
20 shifts and the secondary goal is to assess changes
21 in compactness of districts.
22 A Okay, it wasn't just minimum population. It was
23 minimum population and compare that with the
24 actual population shifts. And I also recognize
25 now, I was thinking about this yesterday when I

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1 was reviewing this, I would have preferred to have
2 said a second goal as opposed to a secondary goal.
3 Q That was going to be one of my questions.
4 A Yes.
5 Q But in your report don't you really only opine as
6 to compactness of Congressional District 3?
7 A No. I address all of them but I don't -- but I
8 indicate that the compactness of the other
9 districts aren't changed very much. Only
10 District 3 has changed a lot.
11 Q In that same page 2 you talk about your data and
12 methods and you talk about the fact that you used
13 software and you used the five compactness
14 indices. Before this afternoon you had indicated
15 that there are at least 20, and is there any
16 reason, other than the fact that the software had
17 those five defaults, that you only used those
18 five?
19 A No. That's the reason. I would not have had the
20 capability to produce others in the time I had
21 available.
22 Q Would you think that a better result would come if
23 you had used more than five indices?
24 A I can't be sure. I doubt it. Certainly, having
25 read those two reports that I cited in here, apart

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1 from -- okay. I do not -- First of all, you say
2 better result. I'm not sure that that word is
3 clearly defined.
4 Q I can define that a little bit better.
5 A That's not --
6 Q I would say more accurate results.
7 A Yes. That's how I would interpret it. I do not
8 have any idea what would happen if we had used the
9 population-based methods. Those may have been
10 quite different. I have no way of knowing. But I
11 feel very comfortable from what I read that the
12 three indentation-based methods that are the
13 defaults in this software and the two dispersion
14 ones are going to be quite typical of the other
15 indentation and dispersion-based. I think it
16 would be quite unlikely that a very different
17 picture would arise from other methods using
18 indentation and dispersion.
19 Q Just a quick question. So when we were talking
20 about the measures before and we talked about the
21 indentation and dispersion and population and
22 there were several tests that you did within those
23 first two, are all of the other indices or tests
24 that for example Niemi lists, are they all one of
25 those three measures or are there other measures?

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1 A I'm not aware of any, and my recollection of the
2 Niemi paper is that all of them are in those three
3 categories.
4 Q Okay. So basically when you're measuring
5 compactness there is three main categories and
6 then in each of those categories you can do
7 several tests?
8 A Correct. That's exactly right.
9 Q And the 20 that Niemi is mentioning are in those
10 three categories?
11 A Correct.
12 Q So we've covered the basis that you --
13 A Yes.
14 Q -- you hit the two?
15 A For which software is available.
16 Q Good. All right. If you can turn to page 6. We
17 start talking about -- you start talking about
18 results relating to compactness and you mention in
19 the middle top of the page, "As I understand it,
20 legal requirements and court cases involved in
21 reapportionment of congressional districts
22 indicate that districts must be 'compact.'" What
23 are you talking about, legal requirements in court
24 cases?
25 A Looking at the Voting Rights Act and looking at

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1 the small number of cases that I did look at, the
2 word compactness appears, that that's important,
3 but as we've gone through before, you know, there
4 are no clear-cut standards for those and I don't
5 have any opinion at all as to what clear-cut
6 standards should be.
7 Q And in that few paragraphs -- or paragraph down
8 you mention the two papers that you read and
9 reviewed, the White Paper and then the Niemi/
10 Grofman paper?
11 A Correct.
12 Q And in addition in your materials here you also
13 have, and I'm going to slip this out --
14 A Yes.
15 Q -- you have a citation to a Michigan Law Review
16 article which is by Richard P-i-l-d-e-s and
17 Richard Niemi?
18 A Yes.
19 Q And that was something -- Did you use this as well
20 for your report?
21 A I purely skimmed it, and from skimming it rather
22 quickly I did not see anything in there that would
23 cause me to do anything differently, but I did not
24 read it carefully.
25 Q Okay. We'll just get a copy of that. I'm not

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1 going to mark that as an exhibit.
 2 In the Niemi paper that you did reference --
 3 A Yes.
 4 Q -- there is a line that states that there is no
 5 score for any one compactness measure that on the
 6 face of it would indicate unsatisfactory
 7 compactness. Would you agree with that statement?
 8 A When you say unsatisfactory, well --
 9 Q Well, actually I didn't, they did, so you have to
 10 tell me if you agree with them, not me.
 11 A Well, I would have to remember the particular
 12 context of that statement, but I would be
 13 inclined -- as I indicated before, I don't think
 14 any single number for compactness is going to
 15 properly describe any situation, so I would be
 16 inclined to agree that there is no single measure
 17 nor a single number on a measure that would
 18 indicate that something is too compact or not
 19 compact enough. I would agree with that.
 20 Q Okay. And I have a quote from here. Just let me
 21 find it. In the third paragraph under results to
 22 compact -- relating to compactness you state, "In
 23 my view imperfect quantitative measures are better
 24 than no quantitative measures if they are
 25 interpreted with sufficient caution." Did you

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1 rely upon imperfect quantitative measures in your
 2 report?
 3 A Well, they're imperfect in the sense -- I mean I
 4 am sure that the numbers that were produced,
 5 because I did enough checking, are the correct
 6 numbers using those procedures, but I don't think
 7 any of those procedures will produce a single
 8 number which I would say, yes, that is the right
 9 number to describe the compactness. I think, as I
 10 indicated, I don't think any single number of
 11 compactness is -- you know, could be viewed as a
 12 gold standard. I think it's an area where there
 13 are a number of different measures. They respond
 14 to different things. And, as I indicated before,
 15 I think it's the -- you know, more the overall
 16 picture that results from looking at several of
 17 these measures and the other factors in the case,
 18 you know the population shifts, community of
 19 interest, which is something I'm not involved in.
 20 I think one has to look at the entire package
 21 together. I mean I'm just quoting something you
 22 said maybe a half an hour ago on that.
 23 Q That's okay.
 24 A Because, I mean, I think that was a very good
 25 statement you made and I totally agree with it.

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1 Q You indicate that you have to view it with
 2 caution. What caution are we supposed to view
 3 your report with?
 4 A Well, my --
 5 MR. HASSETT: Objection. I don't
 6 think the caution refers to his report.
 7 A I was going to say that. I mean the caution
 8 refers to the measures of compactness. And I
 9 think I provide quite a few cautionary comments on
 10 compactness in my report, so I think my report
 11 could be viewed without too much caution.
 12 Q Now, understanding compactness, what you're trying
 13 to get to is as close to 1 as possible; is that
 14 correct?
 15 A Okay. All of these measures are designed, and in
 16 some cases there are sort of fudge factors built
 17 into them, if I can use that term, so that a
 18 circle will give a compactness measure of 1, and a
 19 number -- and something deviating from a circle
 20 will give us a compactness number smaller than
 21 one. Some people, I believe maybe the Azevea
 22 article, they actually multiply everything by
 23 100 --
 24 Q Yes, they did.
 25 A -- so that instead of looking 1 -- between zero

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1 and 1 it goes between zero and 100. But for any
 2 individual measure, any individual measure, a
 3 number that is higher would mean that that
 4 district is closer to a circle than one that is
 5 smaller, but the different measures can be very
 6 different. For instance --
 7 Q Wait. No, wait, wait. Clarify the closer. So
 8 what you're saying, a .2 is less compact than a
 9 .8?
 10 A That is correct. .8 is closer to a circle.
 11 Q All right.
 12 A Right.
 13 Q Continue on.
 14 A Correct. Okay. Now the reason why it is very
 15 difficult to compare these measures, there are a
 16 number of reasons, but one obvious one is that
 17 some of them -- okay. Thinking a little bit about
 18 a circle, I mean probably the most basic
 19 descriptor of the dimensions of a circle would be
 20 the radius. The area of the circle is related to
 21 the radius squared. It's a squared quantity, just
 22 like area is base times height. Perimeter is
 23 essentially in the same unit as distance.
 24 So some of these measures are looking at
 25 distances divided by distances and others are

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1 looking at distance squareds divided by distance
 2 squareds.
 3 So if you're looking at measures that are
 4 essentially quotients, one number divided by
 5 another, of distances and distance squareds,
 6 they're going to behave a priori differently. And
 7 you would see that if you look in my table, for
 8 instance --
 9 Q And you're referring to page 7?
 10 A Right, Table 4. For instance, score one, these
 11 are basically perimeter squared and area. These
 12 are basically measures based on distance squared.
 13 Score two is really just on the units of
 14 distances, distances divided by distances. So
 15 those are just based on distances.
 16 You may recall that for numbers smaller
 17 than 1 if you square them they become smaller.
 18 Like .5 squared is .25.
 19 Q Right. That makes sense.
 20 A If it's bigger than 1 -- All right. So that's why
 21 scores for number one are typically much smaller
 22 than on number two, because they are based on
 23 areas, which is distance squareds. So that's one
 24 reason why it is impossible to directly compare
 25 the different scoring methods.

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1 Q And now looking at these -- this table with your
 2 five scoring methods, the first three are
 3 indentation/perimeter?
 4 A Correct, correct.
 5 Q And the last two are dispersion?
 6 A Correct. Did I state that incorrectly? Because
 7 earlier you seemed to imply --
 8 Q No, I stated it incorrectly before.
 9 A Okay. Okay.
 10 Q So I'm just --
 11 A But that's correct.
 12 Q Okay.
 13 A The first three are indentation. And, as I
 14 pointed out in here, that actually -- and I could
 15 probably give an argument, it's not worth it, that
 16 the way they're defined, if I were to actually
 17 look at the formulas, number one and two are very
 18 much the same and number four and five are very
 19 much the same, except for the squared business,
 20 and they rank the districts exactly the same.
 21 Method three is still an indentation-based method
 22 but it differs a little bit in how it orders
 23 things from score one and score two.
 24 Q And just to clarify, in this chart, when you say
 25 current, you're talking about the 2002 map.

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1 Proposed you're talking about the enacted Act 44?
 2 A Yes. I again apologize for that. I realize
 3 proposed is not -- is politically incorrect.
 4 Q Well, no. The --
 5 MR. SHRINER: No, just incorrect.
 6 Q I don't think it has politics in it for one area.
 7 A I accept that.
 8 Q Now we're going to get a little bit into the
 9 different types of measures, and I'm thinking
 10 perhaps now might be a nice time to take a short
 11 break and then we can --
 12 A I was going to ask for one, so that's an
 13 excellent -- great minds think alike.
 14 Q Thank you.
 15 MR. CAMPBELL: The time is 2:34,
 16 and we are going off the record.
 17 (Discussion held off record)
 18 MR. CAMPBELL: The time is 2:49,
 19 and we are back on the record.
 20 Q Okay. Professor Nordheim, we're going to go
 21 through parts of your report again --
 22 A Okay.
 23 Q -- which is marked as Exhibit 1012.
 24 A Got it.
 25 Q We were talking about compactness and we were

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1 talking about the different measures, and one of
 2 the ones that you used was the dispersion measure;
 3 is that correct?
 4 A You have two dispersion measures. Those are the
 5 ones -- they're reflected in scores four and five.
 6 They're very similar.
 7 Q And is that -- Between that dispersion method and
 8 the indentation method, dispersion is a little
 9 more simple. It relies on a little less formula?
 10 A I wouldn't say so. I mean I have the actual word
 11 descriptions of the formulas just above the table,
 12 and I mean they're all a matter of looking at
 13 ratios of perimeters and areas. So, no, I would
 14 not say that either of the sets is more
 15 complicated than others.
 16 Q Would you say that the dispersion method, one of
 17 its faults would be that it doesn't give a high --
 18 it wouldn't give a high score to an unnatural
 19 figure? Like if you had a very tightly coiled
 20 snake-type gerrymander, that wouldn't show up?
 21 A It is most responsive to large distances, so, yes,
 22 if one had a small, little snake-like thing, it
 23 would be much less sensitive to that, that's
 24 correct.
 25 Q And aren't there certain factors that it doesn't

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1 take into account, some of the indentation
2 factors?
3 A It is much less sensitive to the indentation
4 factors than the other ones are, that's correct.
5 Q And aren't there certain unchangeable factors that
6 you have to take into account, such as in
7 Wisconsin we have several districts that bound and
8 have a boundary with another state?
9 A Well, as I pointed out in my report, that actually
10 for the old congressional districts, all eight of
11 the districts border on either another state or
12 Lake Michigan and in the new ones, since that's
13 the terminology we're using, seven of them do. So
14 that is correct. I mean, that is definitely
15 something to keep in mind.
16 Q And then you also have the weirdness, pardon this,
17 to Door County, the fact that that's sort of a
18 little peninsula up?
19 A Correct.
20 Q Which is going to make a difference regardless of
21 what you're doing?
22 A Door County -- yes. But, as you can see, that
23 that has relatively more effect on the indentation
24 measures than on the others.
25 Q Right. What I'm saying is in the dispersion

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1 method -- measure, it doesn't take into account
2 that sort of indentation difference?
3 A Correct.
4 Q All right. We went into the fact that the
5 autoBound program you used had the five default
6 measures and you used those five?
7 A Correct.
8 Q And you didn't import any other information to use
9 anything other than those?
10 A If I can add something to that --
11 Q Sure.
12 A -- I actually -- I mean there is the capability in
13 autoBound to create other ones, but I actually
14 asked Mr. Gratz and spent some time with him to
15 see what was possible there. And unfortunately
16 the -- I mean in particular I was interested in
17 seeing if it would be even possible to do
18 something based on population density. That
19 information is not available in the program and
20 they could not have performed any kind of
21 compactness scores with any of those.
22 The other ones would have just been slightly
23 different ways of putting perimeter and area
24 together and certainly, you know, the perimeter or
25 the area of a circle that bounds a region, those

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1 would have been the only other alternatives, but I
2 feel that they would have differed very little
3 from the scores given here. I mean other
4 dispersion -- other scores that were responsive to
5 dispersion would have been quite similar to four
6 and five and the other ones that were sort of
7 responsive to indentation would have been similar
8 to one, two and three.
9 Q Okay. And when you're referring there, you're
10 talking about the second paragraph of page 7 where
11 it indicates that autoBound -- autoBoard allows
12 the user to specify other measures. They would
13 have still been within the range of indentation or
14 dispersion?
15 A Correct. Now I think autoBoard is a mistake. It
16 should be autoBound. It's my mistake.
17 Q That's not a problem. That really is not a
18 problem. But what you're talking about is they
19 would have still been within those same measures?
20 A Exactly. And they would have -- I feel quite
21 confident that they would have provided very
22 similar results to these five.
23 Q Now when you did these five tests, the dispersion
24 ones and the indentation ones, what was your basis
25 of comparison? You used the 2002 maps?

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1 A Correct.
2 Q Why did you use those maps?
3 A I think the issue was to determine sort of -- I
4 mean it's just like with population movement.
5 Certainly the previous population movement was
6 based on the currently existing congressional
7 districts and clearly in order to meet the
8 requirement for equal population and equal
9 congressional districts, people are going to have
10 to be moved, you know, out of some and into other
11 congressional districts.
12 So the obvious comparison was between the old
13 and the new districts. So in comparison of
14 compactness scores, I mean using the same two maps
15 seemed to be the appropriate ones, to see if there
16 were changes, if the compactness measures were
17 similar or if they were changed.
18 Q Why didn't you go back ten more years and use
19 1992?
20 A Well, among other things, in 1992 we had an
21 additional congressional district. So it would
22 have been very difficult to do that.
23 Q And did you consider looking further back to the
24 '80s?
25 A Well, for all of the '80s we've -- you know, we've

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1 had nine congressional districts for quite awhile
 2 prior to 2002. So I think that would not have
 3 been relevant.
 4 Q If you can turn to page 8. At the top you
 5 indicate, "A comparison of the magnitudes of the
 6 different measures is not of great importance."
 7 What do you mean by that?
 8 A Well, we talked about that earlier. I mean, for
 9 instance when we looked at score one and score
 10 two, and the same thing would hold for score four
 11 and score five. One is based sort of on distance
 12 squareds and the other is based just on distance
 13 measures, so that's the kind of thing that affects
 14 the overall magnitudes.
 15 So that's why -- Just to be very specific, if
 16 you look at Table 4 and you look, say, at score
 17 one for Congressional District 1, it's .28 in the
 18 current and .29 in the new, and for score two it's
 19 .58 and .58. I mean the score two values are a
 20 lot higher than the score one value but that's
 21 just a function of the fact that score one is
 22 based on sort of squared quantities, and you know
 23 when numbers are smaller than 1 and you square
 24 them they get smaller. So when I said that the
 25 actual numbers didn't mean much, I'm referring

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1 largely to that, or things like that.
 2 Q And now I understand that a little more since you
 3 gave that explanation before.
 4 On page 8 you have Table 5 and it's one
 5 score, and these scores would be just for Act 44,
 6 or am I wrong on that?
 7 A Yes. These scores, like the plus .01, that
 8 represents the difference between the current --
 9 the old and the new. Let's use -- Instead of
 10 current and proposed, let's use old and new. So
 11 basically what I have tabulated in Table 5 are
 12 just the differences between the old and the new
 13 scores from Table 4.
 14 Q Okay. All right. So that's the -- All right. I
 15 understand that. And you indicate below that a
 16 positive score suggests the proposed district is
 17 more compact?
 18 A Correct. Because remember, scores closer to 1 are
 19 closer to a circle.
 20 Q Right.
 21 A Scores farther away from 1, lower, are less like a
 22 circle. So if we raise the compactness score, we
 23 make it more compact, closer to a circle.
 24 Q And on page 9 you have a figure where you just do
 25 a graphic representation of the scores that you

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1 had on Table 5?
 2 A Correct.
 3 Q You indicate on page 9 that, at the end of the
 4 first paragraph, "However, in all cases the
 5 changes are quite modest."
 6 A I say that. That's the changes for scores four
 7 and five. So I'm looking at the dispersion-based
 8 scores, and for the dispersion-based scores, none
 9 of the congressional districts change a whole lot.
 10 That's what that says.
 11 Q Okay. So you indicate that you have a concern and
 12 it comes in that second paragraph which deals with
 13 Congressional District 3 and the U shape that you
 14 say it is. In essence would you say if you kind
 15 of distilled your report on compactness bound that
 16 that's your major concern, the U shape of
 17 District 3?
 18 A Certainly it is the U shape that is giving rise to
 19 that substantial decrease in compactness.
 20 Q And now this U shape -- or the concern you have
 21 for that score is based on only the
 22 indentation-based measure, not the dispersion
 23 scores; correct?
 24 A That's correct, because I think -- in this
 25 particular case I think the dispersion score is

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1 more useful for describing this change. If we
 2 take -- If I may, if you take a look at the
 3 dispersion score, the dispersion score is going to
 4 be related primarily to sort of this distance.
 5 Q And now you're going to have to describe that
 6 because we're not --
 7 A Okay. The distance goes from the most --
 8 Q Wait, wait, wait. Let's start from you're looking
 9 at a map of the 2002 map?
 10 A Sorry. I'm looking at the current districts, or
 11 the old districts. I'm looking at Congressional
 12 District No. 3. The dispersion measures are
 13 related primarily to maybe the ratio of the
 14 longest dimension, sort of the length of the
 15 district, and the width. What has happened in the
 16 new map is, for instance Lafayette County, which
 17 in the old map was in District 3 and in the new
 18 map is not, has helped shorten the total length
 19 from one end to the other. So it's things like
 20 that that have actually brought the dispersion
 21 measures up a little bit.
 22 Q What we're going to do just to make this a little
 23 simpler when we're looking at the transcript is
 24 we're going to mark these two. We'll do it at the
 25 end. We'll mark them as two exhibits, and one

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VIDEOTAPE DEPOSITION OF ERIK V. NORDHEIM, Ph.D. 1/26/2012

1 will be the old map. One will be Act 44.
 2 A Okay. If I may add to this?
 3 Q Absolutely.
 4 A Actually I worked with larger versions of these
 5 maps which belong to Lawton & Cates, and while I
 6 was writing my report, I mean they let me use
 7 those. And so the actual maps which I used are in
 8 the possession of Lawton & Cates.
 9 Q And, for the record, those already have been
 10 marked as exhibits, but we'll just do this so that
 11 your deposition is a little easier to
 12 understand --
 13 A Fair enough.
 14 Q -- and do that. Now your opinion and your
 15 conclusion is summarized on page 9 of -- actually,
 16 I'm sorry, page 10 of your report.
 17 A Correct.
 18 Q And let's look at just conclusion number 2 which
 19 we mentioned before. You're talking in that about
 20 the Act 44 Congressional District 3 and your
 21 concern is the compactness in the indentation
 22 measure; correct?
 23 A Well, maybe I should be careful. I mean I'm not
 24 sure the word "concern" is really the right word.
 25 I mean I was asked to essentially provide whatever

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1 quantification I could as to the effect of these
 2 changes. And I would say, with respect to
 3 compactness, the largest change that I found was
 4 in the compactness scores based on the
 5 indentation-based measures for number 3. So I'd
 6 rather phrase it that way than say that that's a
 7 concern.
 8 Q Okay. And would you state then -- would you state
 9 then that you had no -- I don't want to use the
 10 word concern. You had no issues with
 11 Congressional Districts 1 through 2 and 4 through
 12 8?
 13 A I would say that in terms of unusual changes in
 14 compactness measures, I did not. The only major
 15 concern I had where there was a demonstrable,
 16 large change in compactness score was District 3.
 17 Q Would you say that that compactness issue with
 18 Congressional District 3 would, in your view,
 19 subject to the objection that's coming, render the
 20 Act 44 map unconstitutional?
 21 A I'm not in a position to comment on that. I don't
 22 have any expertise in that area.
 23 Q Have you drawn a map which would have a greater
 24 compactness for Congressional District 3?
 25 A I have not. However, if I may, I am aware of the

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1 fact that there was some discussion with --
 2 separately between Lawton & Cates and Mr. Gratz
 3 that implied that if the parts of Clark County
 4 that were currently in District 3 were moved into
 5 District 7 that would have resolved the population
 6 imbalance issue quite closely. So I was aware of
 7 that discussion, but I made no maps myself.
 8 Q When you say population imbalance, you mean
 9 compactness issues?
 10 A Remember the main reason why people are moved is
 11 to achieve population equality in the
 12 congressional districts.
 13 Q Right.
 14 A I mean that's something that is -- That's
 15 mandated. If I may, I'm looking again at the --
 16 Q Let's take a moment and let's mark these so we can
 17 reference them.
 18 A Okay.
 19 Q So stop saying anything, and we'll have the
 20 court reporter mark them. The first one will be
 21 that one.
 22 A That's old, the old map.
 23 (Exhibit Nos. 1014 and 1015 marked
 24 for identification)
 25 Q And here, what I'm going to show you, what's been

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1 marked as 1014 is the State of Wisconsin
 2 Congressional District map from 2002. What's
 3 marked as Exhibit 1015 is Act 44 Congressional
 4 District map.
 5 A Correct.
 6 Q So when you referenced before in your deposition
 7 and you're talking about the old, or the current
 8 sometimes you called it, you were talking about
 9 1014. When you're talking about the proposed or
 10 the new or Act 44, it's 1015; is that correct?
 11 A That is correct.
 12 Q Excellent. You were going to explain something on
 13 those maps for me.
 14 A Yes. You had asked me the question whether I had
 15 drawn my own maps, and the answer is, no, I was
 16 not asked to do that and I didn't do that. I was
 17 aware that there had been some discussions between
 18 Lawton & Cates and Mr. Gratz that if Clark County,
 19 which can be seen on Exhibit 1014 as split between
 20 old Congressional District 3 and 7, it was the
 21 only county that was split, that if the portions
 22 in District 3 were moved to District 7, that would
 23 have solved almost the entire population imbalance
 24 issue.
 25 Q Okay.

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VIDEOTAPE DEPOSITION OF ERIK V. NORDHEIM, Ph.D. 1/26/2012

1 A That's the sum total of my knowledge or even
2 consideration of some alternative map.
3 Q Have you seen any map that they discussed?
4 A No. I was only -- That was a brief discussion I
5 had at some point and I had no further involvement
6 with anything else that might have happened with
7 regard to that.
8 Q Now will you be giving any opinion at the trial
9 about any other maps?
10 A No.
11 Q We covered this before. I just want to make sure
12 I have it for the conclusion, and we are almost
13 completed. Who in total have you spoken with
14 about your expert report before it was prepared?
15 I'm assuming you did speak with counsel. I'm not
16 asking what you talked to counsel about. I'm
17 asking who you talked to about your report.
18 A Okay. I did speak with counsel, both Mr. Hassett
19 and Mr. Olson. I indicated at the very --
20 Q Okay. I'm just asking you who you talked to. You
21 don't have to go into what you said first. We're
22 just going to get a list of names first.
23 A Okay. Professor Mayer.
24 Q Okay.
25 A My wife.

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1 Q And Joel Gratz?
2 A And Joel Gratz. But I didn't talk to Joel Gratz
3 about the report in any way. I didn't talk to
4 Mr. Mayer, Professor Mayer about the report, but
5 on the project, yes.
6 Q Okay. So you talked to your counsel and your wife
7 about the report?
8 A My wife was purely editing.
9 Q That's fine. Spouses are supposed to do that.
10 You talked to Professor Mayer and Joel Gratz about
11 the project?
12 A Yes.
13 Q Not your report?
14 A Correct.
15 Q And you talked to these individuals before your
16 report was finished?
17 A Correct.
18 Q Okay. Did you talk to anybody after your report
19 was completed regarding your report? Just give me
20 their names.
21 A Mr. Poland.
22 Q And he would be counsel for the plaintiffs?
23 A Yes, but not on the congressional.
24 Q Were you ever asked to change your report by
25 anyone?

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1 A No.
2 Q Did you ever have a different conclusion that's
3 not included in your report?
4 A No.
5 MS. LAZAR: Subject to my looking
6 at a few of your documents, I have no further
7 questions. I'm going to look at those while
8 I believe Mr. Shriner might have a few
9 questions, and then we will possibly be
10 finished.
11 THE WITNESS: I wouldn't mind that.
12 MS. LAZAR: Excellent.
13 MR. CAMPBELL: Mr. Shriner, I've
14 got about 13 minutes left on the tape.
15 MR. SHRINER: Do you want to finish
16 it or do you want to --
17 MR. CAMPBELL: It's up to you.
18 MR. SHRINER: Why don't we break
19 now.
20 MR. CAMPBELL: The time is 3:09.
21 We are going off the record concluding
22 video number 1 of the deposition of Professor
23 Erik Nordheim.
24 (Recess)
25 MR. CAMPBELL: We are on the

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1 record. The time is 3:14. This marks the
2 beginning of disk number 2 of the deposition
3 of Professor Erik Nordheim.
4
5 EXAMINATION
6 By Mr. Shriner:
7 Q Professor Nordheim, I have really just a few
8 questions. I wasn't sure I would get it done in
9 13 minutes and I didn't want to take a break after
10 13 minutes.
11 A That sounds fine.
12 Q I want to ask you some questions probably entirely
13 related to the portion of your report regarding
14 population shifts.
15 A Okay.
16 Q It's not that I don't find the whole subject of
17 compactness fascinating.
18 A As well you should.
19 Q But I don't. But at any rate, I think your report
20 pretty well lays out what you've done. I think I
21 understand it, what you did, what you were asked
22 to do and what you did, and I want to ask you
23 basically just to confirm my understanding on a
24 few points. Looking at your report, which is
25 Exhibit, what, 1012?

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1 A Yes.
 2 Q On page 3 of that report you have Table 1, and let
 3 me just start by talking just briefly on
 4 terminology. You've talked about population
 5 shifts, which is fine. We'll adopt that way of
 6 speaking, but of course people don't move; right?
 7 It's lines that get changed? People stay where
 8 they are. And when you talk about a population
 9 shift from District 3 to District 7, you're
 10 talking about drawing the line in a way so that
 11 District 3 now has fewer people and District 7 has
 12 more?
 13 A That's correct.
 14 Q All right. And I'd assume that from a statistical
 15 point of view it's convenient to refer to that as
 16 moving people; right?
 17 A If I used the terminology moving people, I think
 18 in terms -- when I say moving population, it's
 19 really just to put them in a different category.
 20 Q Right. But you're moving the geography on which
 21 those people live essentially; right?
 22 A Correct.
 23 Q All right. You're putting it into a different --
 24 A So the net effect is that there is a shift in
 25 population.

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1 Q Okay.
 2 A And that's the way I was thinking.
 3 Q That's what I thought, and you've confirmed that.
 4 You talk -- And let's just begin with Table 1.
 5 Table 1 is nothing but a chart that begins in the
 6 first column after the district numbers with what
 7 that district's population had become as revealed
 8 in the 2010 census; is that right?
 9 A Correct.
 10 Q And then District 2 simply are -- the next
 11 column -- Let me get it right. The next column
 12 simply represents a division of the total
 13 population of Wisconsin as disclosed in the 2010
 14 census by eight; right?
 15 A Well, this was actually in the legislative plan.
 16 This is the way that the Legislature decided that
 17 they would allocate the total population among the
 18 districts.
 19 Q But that is as close to a perfect division of the
 20 total population of Wisconsin into eight districts
 21 as can occur; is that right?
 22 A Absolutely.
 23 Q Okay. And then the last column of net change
 24 simply indicated what number of people would be
 25 shifted, we'll use that terminology, needed to be

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1 shifted from that particular district somewhere
 2 else or from somewhere else into that particular
 3 district in order to achieve the desideratum of
 4 710,873 people in each district; correct?
 5 A That's correct.
 6 Q Okay. And so what your chart reveals is just a
 7 mechanical report of numbers derived in the way
 8 that I've just described it?
 9 A Right. And I would say that it's fair to say then
 10 that that third column, the net change column,
 11 could be viewed as the minimum number that needed
 12 to be shifted. At least that many people would
 13 have to be shifted. For instance, if we look at
 14 District 3, in order to go from 729,957 to
 15 710,873, it was necessary to shift 19,084 people
 16 out of District 3.
 17 Q So I was going to ask you that question. In the
 18 parenthetical at the end of the second paragraph
 19 of text right under there, the first paragraph of
 20 text under the table, when you say "These numbers
 21 can be viewed as a bare minimum shift required,"
 22 that's what you meant?
 23 A Correct.
 24 Q That's what these net change numbers are?
 25 A Correct.

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1 Q And, as it turns out, for reasons that maybe
 2 somebody understands, there had been growth in the
 3 first, second and third districts of Wisconsin,
 4 growth in population, and loss in population or at
 5 least not enough -- not growth up to the average
 6 in the other five districts of the state; is that
 7 right?
 8 A That's correct.
 9 Q All right.
 10 A With particular emphasis of loss in District 4.
 11 Q All right. And that is, as you understand, the
 12 urban district in the city and county of
 13 Milwaukee; right?
 14 A Correct.
 15 Q Okay. All right. Now when you say in the next
 16 paragraph on that page that "In order to maintain
 17 jurisdictions of importance," what you give is
 18 examples, "(counties, townships and census
 19 blocks), it is expected that there will need to be
 20 somewhat more transfer of population than the bare
 21 minimum," by that you mean, to the extent that it
 22 is desirable not to split counties, that will make
 23 it more difficult to transfer the bare minimum; is
 24 that right?
 25 A Correct. That's exactly right.

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1 Q And to the extent that it is difficult -- that one
2 wants to maintain townships similarly; right?
3 A (Nodding)
4 Q And census blocks of course are not on the
5 political map of Wisconsin but they're the bare
6 minimum unit that one can use to district. Is
7 that your understanding?
8 A Correct.
9 Q Okay. That is, whatever the census bureau reports
10 as the population within a census block cannot be
11 gone further into for redistricting purposes?
12 A For congressional redistricting purposes.
13 Q Right.
14 A It's my understanding that when it comes to
15 legislative districts that census blocks can be
16 divided.
17 Q Okay.
18 A But that's not relevant to the part of this that
19 I'm involved with.
20 Q And another reason, Professor Nordheim, that there
21 may need to be more than the bare minimum transfer
22 of population beyond the three that you suggest
23 there as examples is the inability to move
24 population, if we can continue to use that
25 metaphor, from one district to the next because,

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1 for example, Congressional District 8 needs to
2 gain population but there is no bordering
3 district, no adjoining district to District 8 that
4 has any to give up; is that right?
5 A Absolutely.
6 Q All right. So you couldn't transfer the bare
7 minimum into Congressional District 8 without
8 throwing things out of kilter?
9 A Absolutely.
10 Q All right. So there has to be some shift across
11 geography. If you're going to shift population
12 into Congressional District 8, it's going to have
13 to come out of -- it's going to have to come out
14 of one of those districts that borders 8, which
15 happen to be 7, 3 and 6, and unless it comes from
16 3 it's going to increase the shortfall in 7 and 6,
17 for example; right?
18 A Absolutely.
19 Q And so you're going to have to have more than the
20 bare minimum transfer into those districts as
21 well?
22 A Absolutely.
23 Q Okay. I just want to make sure we're
24 understanding this correct.
25 A No. That's absolutely correct.

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1 Q And generally speaking the districts that have
2 population to give, 1, 2 and 3, border only on
3 districts that either also have population to give
4 or just a few others. Let's see if you agree with
5 me on this. District 1 can only give up
6 population directly to 4 and 5? I can have you
7 look at the map.
8 MR. HASSETT: Look at the map.
9 A Well, now it depends on the definition of
10 directly. I mean, as you correctly point out --
11 Q Yeah.
12 A -- if I look at District 8, all of the districts
13 which border on it, 7 and 6, also have to gain
14 population. So if 8 is to grow from 6 and 7, 6
15 and 7 are going to have to pick up from others.
16 Q Right. But to the extent -- Let me reframe the
17 question. Tell me whether you agree with me. To
18 the extent that it would minimize the amount of
19 transfer, get it closer to the bare minimum to
20 transfer from a district that needs to give to one
21 that needs to get, District 1 can only give to 4
22 and 5; is that right?
23 A That is correct.
24 Q And District 2 can only give to 5 and 6?
25 A That is -- yes. That's correct.

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1 Q And District 3 can only give to 6 and 7?
2 A That's correct.
3 Q And likewise -- I'm sorry, we'll share the map.
4 I'll hand it back. And to the extent that -- Just
5 to follow up on the point we made about
6 District 8, to the extent that a district needing
7 to gain population, a low population district,
8 were to acquire population from a -- directly from
9 an adjoining district with excess population, so
10 to speak, District 4 could only have gained from
11 District 1; is that right?
12 A That is correct.
13 Q District 5 could have gained only from Districts 1
14 or 2?
15 A Correct.
16 Q District 6 could gain only from 2 or 3?
17 A Correct.
18 Q District 7 could gain only from 3?
19 A That's correct.
20 Q And 8 has nowhere?
21 A That's correct.
22 Q Okay. Thank you. We talked -- You were
23 talking about the -- as one of the examples of
24 what might interfere with the desire to transfer
25 only the bare minimum the desire not to split

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1 counties. I thought I heard you say in answer to
2 a question that Ms. Lazar asked you that the old
3 map, that is what we've now marked as Exhibit
4 1014, only split one county but the new map, 1015,
5 splits five; is that right?
6 A That's only between Congressional Districts 3 and
7 7.
8 Q Okay. I see what you're saying.
9 A Overall -- I did look at this. Overall the old
10 map split 11 and the new map splits 12.
11 Q Okay.
12 A But as far as the border between 3 and 7, the old
13 map split one and the new map splits five.
14 Q Okay. I appreciate the clarification. I didn't
15 understand that.
16 Another thing you said -- Now let me see if I
17 understand this again correctly. I've now turned
18 to page 4 of your expert report, and I think I
19 understand from your answer to Ms. Lazar's
20 questions what you've done. I think your
21 explanation in text is fine too. What you've done
22 in Table 2 and your description of the numbers on
23 the diagonal, the numbers on the diagonal being
24 when comparing the current district -- the
25 district -- the old district to the new district,

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1 the district on the diagonal is sort of the
2 retention; right?
3 A Correct.
4 Q Okay.
5 A I believe Professor Gaddie would refer to that as
6 the retained core.
7 Q Okay, or core retention sometimes, retained core.
8 It's the population that was in District 1 and is
9 still in District 1 and so on?
10 A Correct.
11 Q Okay. You said in answer -- And I think I do
12 understand. If I were to look down the first
13 column, for example, which is -- the first column
14 being the proposed District 1, which is to say
15 Act 44's District 1, 686 thousand and some of its
16 current population under the new law is from old
17 District 1?
18 A Yes.
19 Q 1,300 was transferred to it from District 2;
20 right?
21 A Correct.
22 Q And 23 thousand and change transferred from
23 District 5; is that right?
24 A That is correct.
25 Q For a total of something like 24,000 transfers in

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1 from other districts; right?
2 A That's correct.
3 Q Okay. And we could do the same. And likewise,
4 looking across the top line --
5 A If I may?
6 Q Yeah.
7 A If you would look at Table 3, you would see --
8 Q You've shown it graphically.
9 A Even above the graphic table.
10 Q Oh, I see. I'm sorry.
11 A You see that 24,715?
12 Q I do.
13 A That is exactly the sum of those 1,322 and the
14 23,393.
15 Q So I didn't need to sit here and do it with my
16 pencil during your --
17 A I think it was good, though, to make sure that
18 we're all on the same page.
19 Q Well, we're close.
20 A I appreciated your doing that.
21 Q And then just -- Figure 1 is just a graphic
22 representation of what's on Table 3; is that
23 right?
24 A Correct.
25 Q Okay. You say, and maybe this is the same thing,

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1 on page 6 of your report in the top paragraph, "As
2 noted above, the net shift in Table 1 can be
3 thought of as the minimum shift required." And
4 you go on to say, "Also as noted above, the actual
5 shifts are likely to be somewhat larger than those
6 in order to respect the integrity of various
7 jurisdictions such as counties, townships and
8 census blocks." That's really repeating what you
9 said on an earlier page?
10 A Right. And I would like to augment that
11 specifically with a statement that you made like
12 with District 8. Since there is no way that you
13 can get enough people in District 8 from adjacent
14 districts that have to give up population, there
15 is going to have to be sort of some carryover from
16 several districts. So that would be an additional
17 argument for -- in favor of the actual shifts
18 being slightly larger.
19 Q The rest of this text it seems to me is
20 computational, largely. I'm not talking about the
21 compactness part of it. Leading to your
22 conclusion on page 10 with respect to the
23 population shifts, that the proposed plan results
24 in the transference of population substantially in
25 excess of the minimum transference required and

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1 the two largest inter-district population
2 transfers are from Congressional District 7 to 3
3 and from 3 to 7; is that correct?
4 A That's correct.
5 Q Now when you say the two largest, you're talking
6 about back on page 4, Table 2. You're talking
7 about the direct transfers from 7 to 3 and 3 to 7;
8 is that right?
9 A That is correct.
10 Q So those numbers that you've italicized and
11 bolded, 150,395 moved from District 7 to District
12 3 -- I'm sorry, have I got that backwards?
13 A That's correct.
14 Q No, from District 7 to District 3?
15 A That's correct.
16 Q Then 116,268 moved from District 3 to District 7;
17 is that right?
18 A That's correct.
19 Q Okay. Is that what you meant when you told
20 Ms. Lazar that the most unusual of the districts
21 is District 3?
22 A Well, at that time in terms of population shifts
23 it was 3 and 7, but I was referring to the fact
24 that those were the two largest numbers off the
25 diagonal in this table.

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1 Q Okay. They're not necessarily the largest total
2 shifts between districts?
3 A Those are the -- If you look at all of the numbers
4 off of the diagonal, they are the two largest
5 numbers.
6 Q Absolutely. But if I can go back for a moment to
7 the table that you pointed me to that I should
8 have picked up earlier, I didn't mean to denigrate
9 your work, the largest -- Table 3 is written
10 in terms of the number shifted out of old
11 District 1 -- or shifted into old District 1 and
12 shifted out of old District 1; right? So this
13 is --
14 A So basically what that means is the new
15 District 1 --
16 Q Right.
17 A -- would have 41,883 from -- okay, from the old
18 District 1 and the new District 1, 41,883 people
19 that were in old District 1 would be transferred
20 out.
21 Q Okay.
22 A 24,715 people that were in other old districts
23 have been shifted in to new District 1.
24 Q Okay. Okay. I think I understand what you had to
25 say. Why were you -- Other than the fact that you

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1 were asked to, why were you looking at population
2 transfer numbers and analyzing those? Did you
3 understand what significance that would have?
4 A I would say that, I mean, again, as I've indicated
5 before, from my reading of, you know, the law and
6 previous trials, there are a number of factors
7 that relate to changing of congressional districts
8 and one would certainly imagine that the larger
9 the numbers that were shifted beyond what was
10 necessary, you know, the more one might want to
11 inquire as to why.
12 Q Right.
13 A But beyond that, and that I was asked to do it,
14 no.
15 Q You were just providing an accurate statistical
16 analysis for the lawyer's use?
17 A That's correct.
18 Q You weren't making judgments yourself?
19 A And you can see I avoided all judgmental verbiage
20 in my report. Nowhere do I state that I think
21 this is excessive from a legal point of view,
22 because I don't -- that's beyond my feeling, my
23 position of expertise.
24 Q You don't have a basis on which to say whether
25 it's excessive or not?

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1 A Absolutely correct.
2 Q Okay. In your notes, and I think e-mail, I guess
3 I'm looking at e-mails and I guess I'm looking at
4 Exhibit 1011, and I think Ms. Lazar has asked you
5 about this sufficiently, but you did give some
6 consideration to comparing the degree of
7 population transfer between districts comparing to
8 those in the laws enacted in other states; is that
9 right?
10 A Okay. I remember at one point in time I asked
11 Mr. Hassett and Mr. Olson if there might be any
12 information available on what the magnitude of
13 population shifts had been in other states.
14 Q If I could direct you to page 16 of Exhibit 1011.
15 A Right, right.
16 Q Is that what you're referring to?
17 A Yes.
18 Q And I believe you told Ms. Lazar you actually
19 followed up by talking to somebody at the
20 Democratic National Committee about that?
21 A Correct. I guess Mr. Hassett had found that
22 individual's name.
23 Q Right.
24 A I called to see what he had. He thought they
25 might have something, but we did not pursue it.

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1 Q Okay. You didn't pursue it, look at it and decide
2 not to pursue it further?
3 A Absolutely not. That's --
4 Q Okay. And you've talked to Professor Mayer about
5 the possibility of looking at this as sort of a
6 follow on project?
7 A Purely -- That would be a purely research project.
8 Q Uh-huh.
9 A In which the main -- probably the more minor
10 aspect would be to put together a database that
11 would be helpful --
12 Q Right.
13 A -- for future events like this one, if I can use
14 the word event, but I think it would be very
15 interesting from a point -- from a scientific
16 point of view to determine what might -- and it
17 wouldn't be just population shifts. It would be
18 compactness, it would be communities of interests,
19 all the possible things that occur, or questions
20 that are raised when there are new districts, to
21 see if -- what the effects would be of divided
22 government, you know where the --
23 Q Divided government generally means the Court is
24 going to draw the line; right?
25 A Well, sometimes. Like for instance ten years ago

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1 for the congressional districts, my understanding
2 was that Mr. Obey worked with Mr. Sensenbrenner
3 and they came to agreements right away and there
4 were no --
5 Q Well, maybe not right away, but they came to
6 agreement; correct?
7 A Okay. I don't know about right away. I'm
8 speaking --
9 Q That is your understanding, and your understanding
10 is correct. As a matter of fact, I think the
11 record will reflect that that's how the
12 congressional maps have been drawn for the last
13 40 years in Wisconsin.
14 Have you thought about going back to compare
15 the degree of population shift that occurred, for
16 example, between the maps -- congressional maps
17 drawn after the 1980 census and after the 1990
18 census to see whether they reflect minimum
19 population transfers of the sort you've analyzed
20 here?
21 A I did not think of doing that for this analysis,
22 but in thinking about what I might want to do with
23 Ken Mayer and his colleagues, I was thinking we
24 would want to go back maybe to at least as far
25 back as 1992 and explore --

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1 Q Well, you've made the point that between 1990 and
2 2000 the population did not grow largely --
3 quickly enough and we lost a congressional seat?
4 A Well, that's within Wisconsin.
5 Q Right.
6 A My proposal for -- with Ken Mayer is national.
7 It's to look essentially at all states just to get
8 an overall pattern in how the -- and what seemed
9 to be the predictors of changes in compactness,
10 magnitudes of population shifts, et cetera,
11 et cetera under certain circumstances, when the
12 Court has done it, when -- like in Iowa there is a
13 commission that's charged with doing it, when you
14 have a government that -- where all of the levers
15 of power are with one party or where the parties
16 are shifted, but that has nothing to do
17 specifically with Wisconsin.
18 Q But you didn't consider with Wisconsin comparing
19 the '81 or '82 redistricting to the '90 or '91
20 or '92 redistricting?
21 A I did not, no.
22 Q Even though there was stability in the number of
23 congressional districts?
24 A That's correct. I did not do that.
25 MR. SHRINER: I have nothing else.

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1 Thank you.
2 MR. HASSETT: I have nothing.
3 MS. LAZAR: Nothing further.
4 MR. CAMPBELL: We are off the
5 record. This concludes the video deposition
6 of Professor Erik Nordheim. The time is
7 3:38 p.m.
8 (Adjourning at 3:38 p.m.)
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1 STATE OF WISCONSIN)
) ss.
 2 COUNTY OF DANE)

3 I, PEGGY S. CHRISTENSEN, a Registered
 4 Professional Reporter and Notary Public duly
 5 commissioned and qualified in and for the State of
 6 Wisconsin, do hereby certify that pursuant to notice
 7 and subpoena, there came before me on the 26th day of
 8 January 2012, at 1:08 in the afternoon, at the
 9 offices of Lawton & Cates, S.C., Attorneys at
 10 Law, Ten East Doty Street, in the City of Madison,
 11 County of Dane, and State of Wisconsin, the following
 12 named person, to wit: ERIK V. NORDHEIM, Ph.D., who
 13 was by me duly sworn to testify to the truth and
 14 nothing but the truth of his knowledge touching and
 15 concerning the matters in controversy in this cause;
 16 that ERIK V. NORDHEIM, Ph.D. was thereupon carefully
 17 examined upon his oath and his examination reduced to
 18 typewriting with computer-aided transcription; that
 19 the videotape deposition is a true record of the
 20 testimony given by the witness; and that reading and
 21 signing was not waived.

22 I further certify that I am neither
 23 attorney or counsel for, nor related to or employed
 24 by any of the parties to the action in which this
 25 deposition is taken and further that I am not a

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1 relative or employee of any attorney or counsel
 2 employed by the parties hereto or financially
 3 interested in the action.

4 In witness whereof I have hereunto set my
 5 hand and affixed my notarial seal this 30th day of
 6 January 2012.

7
 8
 9 Notary Public, State of Wisconsin
 Registered Professional Reporter
 Certified Realtime Reporter

10
 11 My commission expires
 August 19, 2012

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